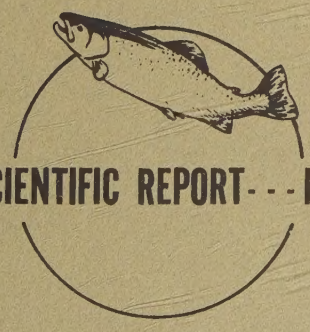
# Central North Pacific Albacore Surveys May to November 1955



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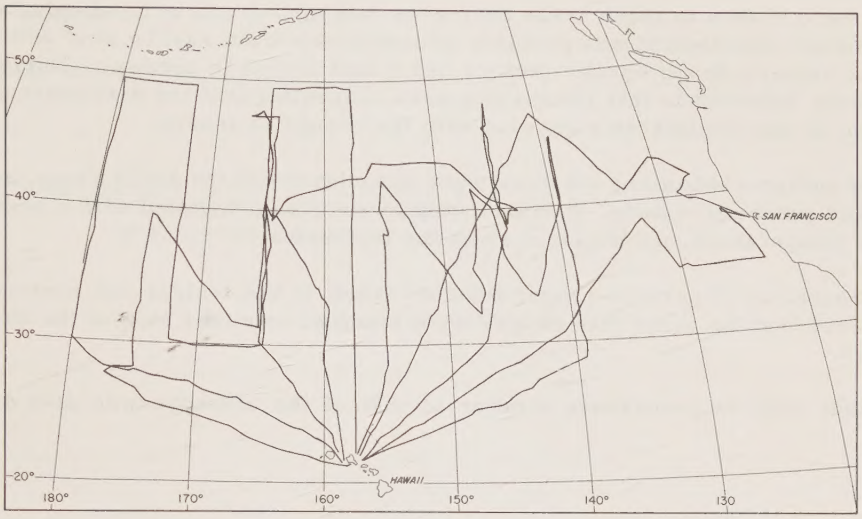


# CENTRAL NORTH PACIFIC ALBACORE SURVEYS, MAY TO NOVEMBER 1955

By

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## ABSTRACT

Five cruises were completed by Pacific Oceanic Fishery Investigations during May-November, 1955, to investigate the albacore tuna, Germo alalunga (Bonnaterre), resources to the north and northeast of the Hawaiian Islands.

Albacore were scarce in these areas during the late spring and were abundant during the late summer. The summer distribution was probably discontinuous from east to west with concentrations in the central and eastern North Pacific sectors and a lack of fish in between. During the fall albacore were relatively abundant in this intervening area suggesting that the discontinuity was either a transient condition or had diminished somewhat with the change in season.

Catches of surface-swimming albacore were associated with the Polar Front, a transition zone between central and subarctic waters. Surface catches were also associated with a seasonal latitudinal change in surface temperature, particularly about the isotherms 55° to 65°F.

Length frequencies of surface-caught albacore taken in the central and eastern sectors of the North Pacific showed that the same size ranges were sampled on either side of the east-west discontinuity noted above.

A latitudinal shift in occurrence similar to that of the albacore was also displayed by other fishes.

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# CENTRAL NORTH PACIFIC ALBACORE SURVEYS, MAY TO NOVEMBER 1955

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The Pacific Oceanic Fishery Investigations (POFI) of the U. S. Fish and Wildlife Service is conducting a comprehensive study of the resources of the albacore tuna, Germo alalunga (Bonnaterre), north and northeast of the Hawaiian Islands under Public Laws 329 and 466 (the latter known as the Saltonstall-Kennedy Act). This investigation is primarily concerned with the distribution and abundance of albacore with a view to commercial exploitation and is supported by biological and oceanographic studies. To date, 11 cruises, 8 exploratory fishing and 3 oceanographic, have been completed; the results of 6 of these cruises in 1954-55 have been described (Shomura and Otsu 1956). This report will deal primarily with the fishing results obtained from the remaining 5 cruises completed during 1955. The general cruise periods and areas of operation are given in table 1.

The 5 cruises were undertaken by the research vessels Hugh M. Smith, John R. Manning, and Charles H. Gilbert under the command of Barnes Collinson, Fred E. Barnett, and William T. Tanaka respectively. The scientific data were collected by or under the direction of Field Party Chiefs Richard S. Shomura (Smith 29 and Gilbert 23), Tamio Otsu (Manning 26), Wilvan G. Van Campen (Manning 25), and James W. McGary (Smith 30). I wish to acknowledge the sincere efforts of the captains, crews, and scientists in making these data available.

The area under investigation by POFI lies between two important North Pacific albacore fisheries. The Japanese longline fishery extends from the coast of Japan to the vicinity of Midway Island (Suda 1954) and fishes for deep-swimming albacore. The North American trolling fishery has its nucleus along the coast of southern California (Clemens 1955) and fishes for surface-swimming albacore. To insure adequate vertical as well as horizontal sampling of albacore in the area between these two fisheries, POFI has employed both longlines and surface trolling gear. Surface gill netting has also been undertaken to a limited extent.

## MATERIALS AND METHODS

A detailed description of POFI albacore longline gear has been presented by Mann (1955) and Shomura and Otsu (1956). Briefly, the basic unit, or "basket," of gear is composed of 210 fathoms of mainline to which floats are attached at either end. Droppers 3 fathoms long are suspended from this mainline at intervals of 15 fathoms. Wire leaders and hooks are attached to the droppers. POFI longline sets during the above cruises consisted of 40 baskets of gear, with 13 hooks per basket. To secure a wide vertical range over the entire horizontal range of sampling, 5- and 15-fathom floatlines were alternated in groups of 10 baskets. The former were set taut and the latter at normal slack. Sets were made at daybreak (0500) and hauling commenced at noon. Setting required approximately 1 hour and hauling 3 to 4 hours, allowing a fishing time of roughly 6 hours.

The maximum depth fished by baskets in several parts of the set and the symmetry of individual baskets were measured by the use of sounding tubes as described by Shomura and

Table 1.--POFI cruises investigating albacore tuna resources in the North Pacific, 1955

| Cruise | Activity | Period of operation | General area covered | |
|---|---|---|---|---|
| | | | N. latitude | W. longitude |
| Manning 25 | Albacore surveys | 5/2 -6/7 | 23° - 42° | 157° - 176° |
| Smith 29 | do | 5/2 -6/4 | 20° - 46° | 139° - 157° |
| Manning 26 | do | 7/15-9/10 | 29° - 48° | 122° - 153° |
| Smith 30 | Hydrographic (NORPAC) | 7/15-8/28 | 20° - 50° | 155° - 180° |
| Gilbert 23 | Albacore surveys | 9/15-11/2 | 21° - 48° | 145° - 165° |

Otsu (1956). Tubes were placed on dropper 7 (the middle dropper) in baskets 5, 15, and 35, Manning (cruise 25); in baskets 5, 15, 26, and 35, Smith (cruise 29) and Manning (cruise 26). An extra basket bearing sounding tubes on droppers 4, 7, and 10 was placed between baskets 25 and 26 on all longline cruises. During the Gilbert's cruise 23, extra baskets with tubes on droppers 4, 7, and 10 were placed between baskets 5 and 6, 15 and 16, 25 and 26, and 35 and 36. Droppers bearing sounding tubes and all droppers in extra baskets were hookless. This to some extent prevented excessively deep readings due to the diving of captured fish.

Trolling was done usually with 5 to 8 lines bearing varieties of feathered, bone, and plastic jigs (Shomura and Otsu 1956). Trolling speeds varied from about 6 to 9 knots. When in waters believed to contain albacore, trolling was confined to speeds of 6 to 7 knots. This general range of speed is thought to be optimum (Powell et al. 1952) for catching albacore on trolling gear. In addition to trolling on the runs between longline and gill-net stations, 2 hours were devoted to trolling on each longline station, but little or no time was devoted to circling and "working" productive areas. All trolling was carried out during daylight.

Gill nets were used experimentally during cruise 23 of the Gilbert as a supplement to surface trolling. Their use was prompted by the relatively good catches of albacore made by the Pacific Salmon Investigations (PSI) of the Fish and Wildlife Service (Tester 1956). These catches were made in salmon gill nets set in the general area under investigation by POFI. POFI's gear consisted of 6 shackles, each 300 fathoms long and 100 meshes deep. A set was composed of 2 shackles each of 5-, 6-, and 7-inch (stretched measure) mesh nets. The nets were set at dusk and hauled at daybreak.

## DISTRIBUTION AND ABUNDANCE

The Manning (cruise 25) and the Smith (cruise 29) explored the late spring distribution and abundance of albacore between 176°W. and 139°W. longitude (fig. 1). Surface-swimming albacore were scarce in the area surveyed. A single albacore was taken on each cruise or less than 1 fish per 100 line hours' trolling at speeds of 6 to 7 knots (table 2).

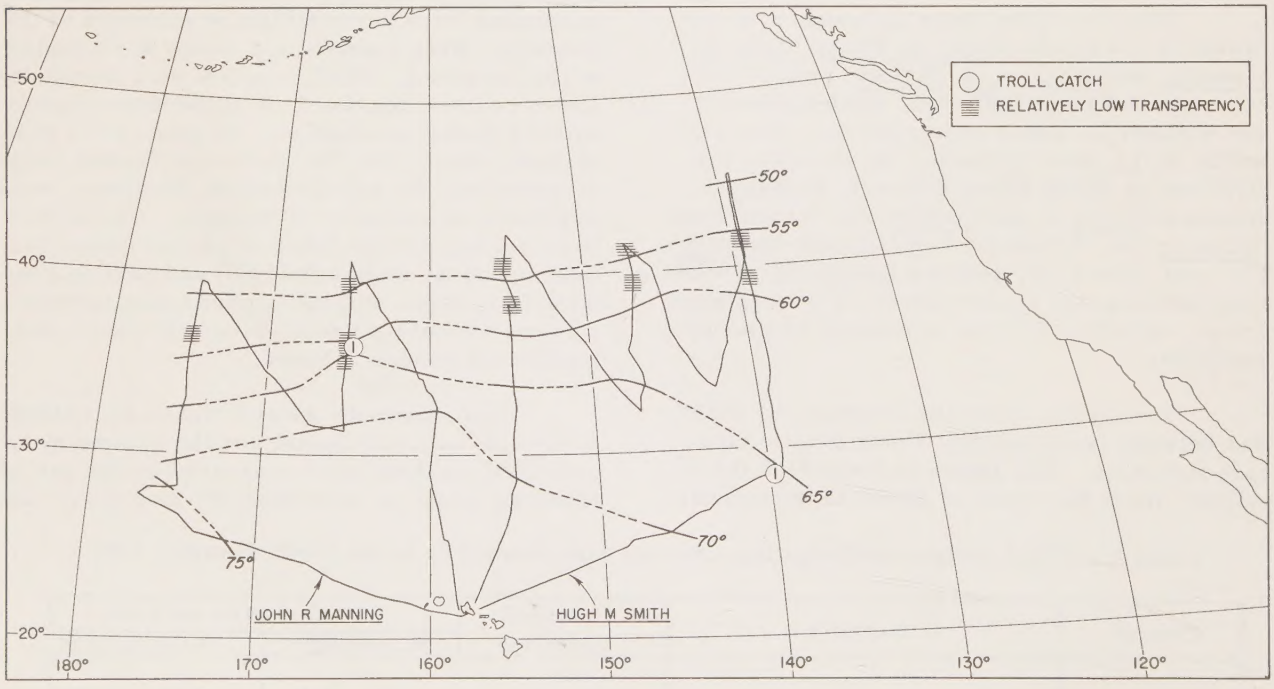


Figure 1.--Spring cruises of the John R. Manning (cruise 25), May 2-June 7, 1955, and the Hugh M. Smith (cruise 29), May 2-June 4, 1955. Tracks of each cruise are shown together with surface temperature (°F.) and the distribution of water of relatively low transparency, in relation to surface albacore catches.

Table 2.--Trolling effort and albacore catches

| Cruise | Line hours | | Albacore catch per 100 hours' trolling | | Total albacore taken |
|---|---|---|---|---|---|
| | Speeds | | | | |
| | 6-7 knots | Other | 6-7 knots | Other | |
| Manning 25 | 1,308 | 153.5 | 0.1 | 0 | 1 |
| Manning 26 | 1,713 | 453 | 3.7 | 0 | 64 |
| Smith 29 | 1,665 | 51 | 0.1 | 0 | 1 |
| Smith 30 | 205 | 1,583.5 | 2.9 | 0.1 | 7 |
| Gilbert 23 | 2,735 | 613 | 2.3 | 0 | 64 |

An unidentified school, which may have been albacore, was observed at the surface by the Smith (cruise 29) at 37°41'N. latitude, 154°54'W. longitude, well within the so-called "albacore water" with which troll catches have been associated (Shomura and Otsu 1956).

No deep-swimming albacore were taken on either of the spring POFI longline cruises (fig. 1). During May-June, 1955, 3 albacore were captured by the N. B. Scofield (Anonymous 1955) of the California Department of Fish and Game on longline gear at 28°N. and 29°N. latitude, 135°W. longitude, approximately 210 miles east of where the Smith took a single surface-swimming albacore by trolling. The Scofield surveyed the area roughly from the easternmost leg of the Smith's cruise 29 to the Pacific coast, i.e., from 26°N. to 36°N. latitude and 135°W. to 177°W. longitude.

During the late summer, albacore are caught commercially along the coast from San Francisco (38°N. latitude) to the central portion (27°N. latitude) of Baja California, and as far offshore as 125°W. longitude (Clemens 1955). The results of the Manning's survey (cruise 26) in the late summer of 1955 appeared to extend this productive ground (see outlined area, fig. 2) to the northwest into an area not presently

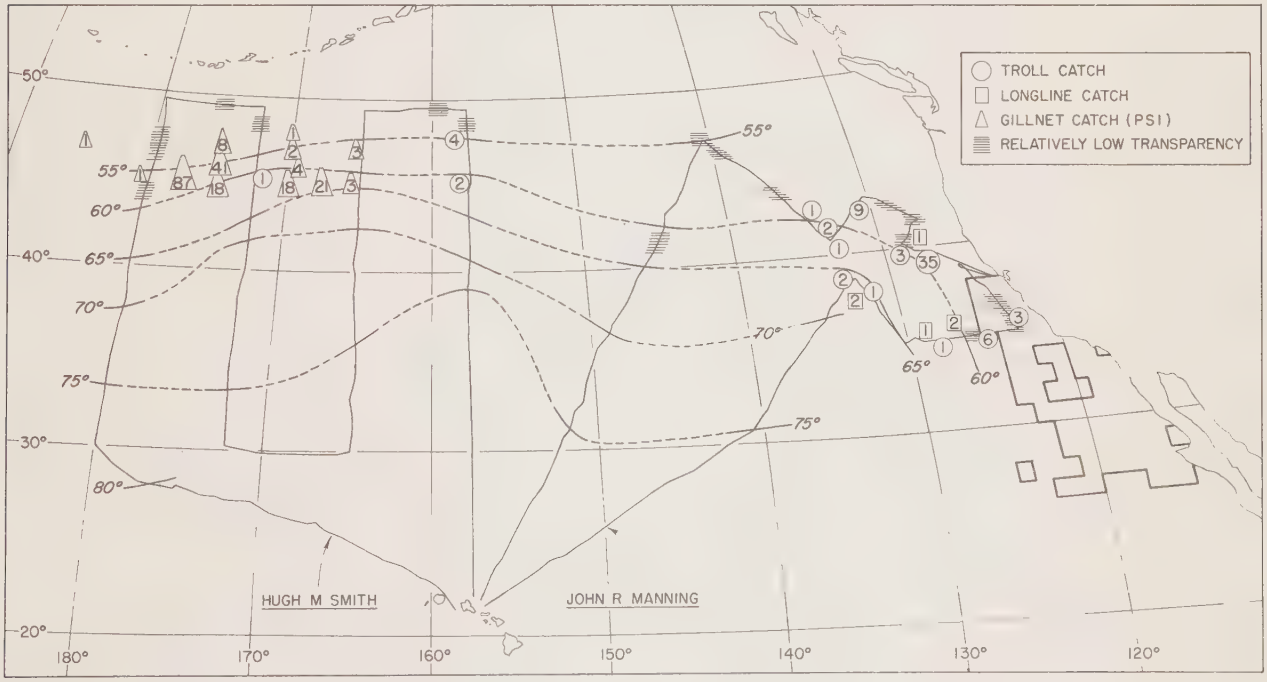


Figure 2.--Summer cruises of the John R. Manning (cruise 26), July 15-September 10, 1955, and the Hugh M. Smith (cruise 30), July 15-August 28, 1955. The track of each cruise is shown together with surface temperature (°F.) and the distribution of water of relatively low transparency, in relation to surface and subsurface albacore catches. The general area of the California albacore fishery for the months of July and August 1951-53 combined is outlined (Clemens 1955).

supporting a commercial fishery. On August 12, 35 albacore were landed by trolling gear during 12 hours of fishing, for a catch rate of 4.9 fish per 100 line hours; an additional 18 fish were hooked and lost. To the westward catches diminished, no albacore being taken by the Manning west of 135°W. longitude. Farther westward, beyond 155°W., the Smith took 7 fish, suggesting that there was perhaps a discontinuous distribution of surface-swimming albacore in the central and eastern Pacific during the summer months.

While the Smith's catch was small, table 2 shows that of 1,788 line hours fished only 205 were at 6 to 7 knots. At these optimum trolling speeds the catch was 2.9 fish per 100 line hours, which is comparable with that of the Manning (cruise 26). In addition, the findings of the Smith were supported by catches taken in salmon gill nets operated within the same area and period by the vessels Mitkof and Paragon (Tester 1956) chartered by the Pacific Salmon Investigations. Figure 2 shows that albacore were taken at the surface in the western section fished by the Smith and also as far west as 175°E. longitude. The largest catch was 87 fish at 45°N. latitude, 177°W. longitude.

During the late summer, longline fishing for albacore was done only by the Manning (cruise 26). Figure 2 shows the positions at which the total catch of 6 albacore was taken. Their distribution was similar to the Manning's surface catch in that they were made to the east of 135°W. longitude, but not to the west.

Possibly, the discontinuity in albacore distribution noted during the late summer was either transient or had diminished somewhat when the Gilbert (cruise 23) surveyed the area between 145°W. and 165°W. longitude northeast of the Hawaiian Islands. Figure 3 shows that fish were taken by the Gilbert in greatest numbers when trolling along longitude 145°W. and at about 42.5°N. latitude, 148°W. longitude. The Gilbert sighted an albacore school at 45°N. latitude, 145°W. longitude, slightly north of the position where the largest troll catch was made. Albacore were not encountered between 148°W. and 165°W. longitude. Stormy weather prevented an adequate assessment of surface-swimming albacore between these longitudes. The Mitkof of the Pacific Salmon Investigations took a single albacore in a salmon gill net at 145°W. longitude, 48°N. latitude (fig. 3) in about the same period (September) as the Gilbert's cruise, but none was taken along 155°W. longitude, where the Mitkof occupied stations on 49°, 50°, and 51°N. latitude. However, we would not expect albacore to occur at these latitudes because of the low surface temperatures.

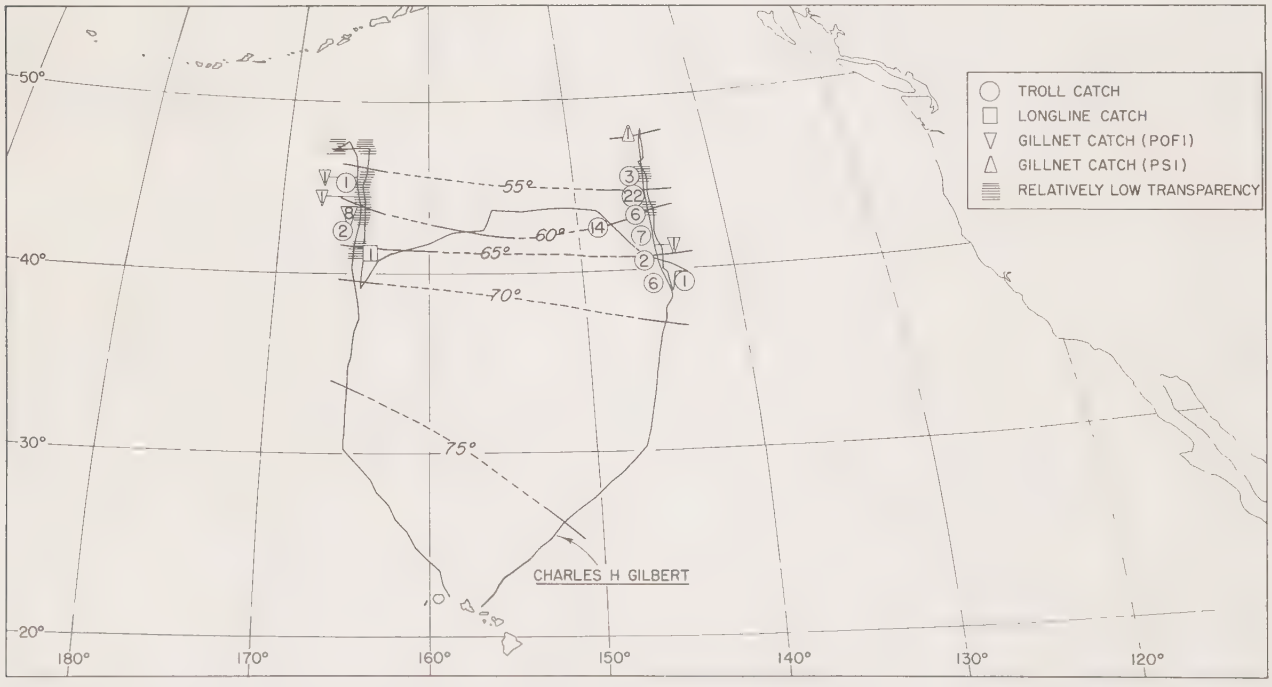


Figure 3.--Fall cruise of the Charles H. Gilbert (cruise 23), September 15-November 2, 1955. The track of the cruise is shown together with surface temperature (°F.) and the distribution of water of relatively low transparency, in relation to surface and subsurface albacore catches.

Gill nets were employed successfully by the Gilbert (cruise 23) on the first leg of the cruise, on 165°W. longitude, but their use was restricted by bad weather on the second leg, on 145°W. longitude (fig. 3). Of four catches made only one contained more than a single albacore and this consisted of 8 fish taken at 43°22'N. latitude, 164°40'W. longitude. All of the fish except one were properly gilled in the nets. Bad weather also restricted longlining on the second leg of the cruise, allowing only 3 sets; all were either north or south of what is considered "albacore water." A single deep-swimming albacore was taken at 41°40'N. latitude, 164°29'W. longitude (fig. 3).

Briefly, within the areas surveyed (table 1, figs. 1, 2, and 3) albacore were scarce in the central and eastern North Pacific during the late spring and were abundant during the late summer. The summer distribution was probably discontinuous, with concentrations in the central and eastern North Pacific sectors and a lack of fish in between. During the fall albacore were relatively abundant in this intervening area, suggesting that the discontinuity was either a transient condition or had diminished somewhat with the change in season.

## ENVIRONMENTAL CONDITIONS

The association of albacore catches with the Polar Front has been reported by Shomura and Otsu (1956). This boundary or transition zone between central and subarctic waters is probably a more or less constant source of enrichment to the surface waters (McGary and Stroup 1956) as indicated by the occurrence of relatively high concentrations of dissolved inorganic phosphate. The relatively low transparency of the surface waters may be evidence of increased biological productivity. Superimposed on the Polar Front is a seasonal latitudinal change in surface temperature. Previous results (Shomura and Otsu 1956) and those reported below suggest that the movements of surface albacore are coordinated with this shift in temperature, particularly about isotherm 55°F. to 65°F.

Figures 1, 2, and 3 show that albacore taken at the surface during the spring, summer, and fall cruises were clustered about isotherms 55°F. to 65°F. and, especially during the latter two seasons, were within or adjacent to areas of relatively low transparency. In the spring, the Manning (cruise 25) took a single albacore along the 65°F. isotherm at 35°38'N. latitude, 165°W. longitude, and the Smith (cruise 29) also took one along the same isotherm, but at a more southerly latitude, 28°56'N., 139°07'W. longitude. The latter catch was considerably south of the areas of low transparency. Summer catches showed a much closer association with the Polar Front in that they were within or adjoining areas of relatively low transparency. To the west of 155°W. longitude the front extends roughly east and west in a narrow band, but east of this longitude the front curves southeast and loses much of its continuity. A positive association of albacore surface catches and the Polar Front is suggested in this instance since catches to the west of 155°W. longitude were made within a narrow range of latitude, while those to the east showed an extended distribution. Fall conditions with a drop in surface temperature set in during cruise 23 of the Gilbert; albacore were taken roughly between latitudes 42°30'N. and 46°00'N. along longitude 165°W. and from 40°00'N. to 48°00'N. along longitude 145°W. As in previous catches, these were taken along the Polar Front.

Deep-swimming albacore were sampled exclusively with longline gear. Temperature profiles and the approximate depth of the gear fished suggest that most catches were made in areas of abrupt temperature change, which were probably subsurface manifestations of the Polar Front (figs. 5-8 of the Appendix).

## SIZE COMPOSITION

A comparison of size frequencies of surface-caught albacore taken in the central and eastern sectors of the North Pacific shows (fig. 4) that the same size ranges were sampled on either side of the discontinuity in distribution noted above. During the late summer at least three size groups were present in both areas, with modes at 50-55 cm., 60-65 cm., and 75-80 cm. The Smith (cruise 30) captured only 7 albacore; their size range agrees roughly with those taken by the Manning (cruise 26). While the number taken by the Smith is too small for adequate comparison, the size range of 52 albacore (fig. 4) captured at the surface in gill nets west of 160°W. longitude by the Mitkof agrees well with that of the Manning's catch. A similar agreement is indicated in the fall catches, where the same three size groups are represented in the eastern and central sectors of the North Pacific.

The size range of albacore taken in gill nets by the Mitkof corresponds closely to those taken on troll lines by POFI vessels. Such a similarity between gill-netted and troll-caught albacore is also evident in catches made by the John N. Cobb (Powell et al. 1952) off the Oregon

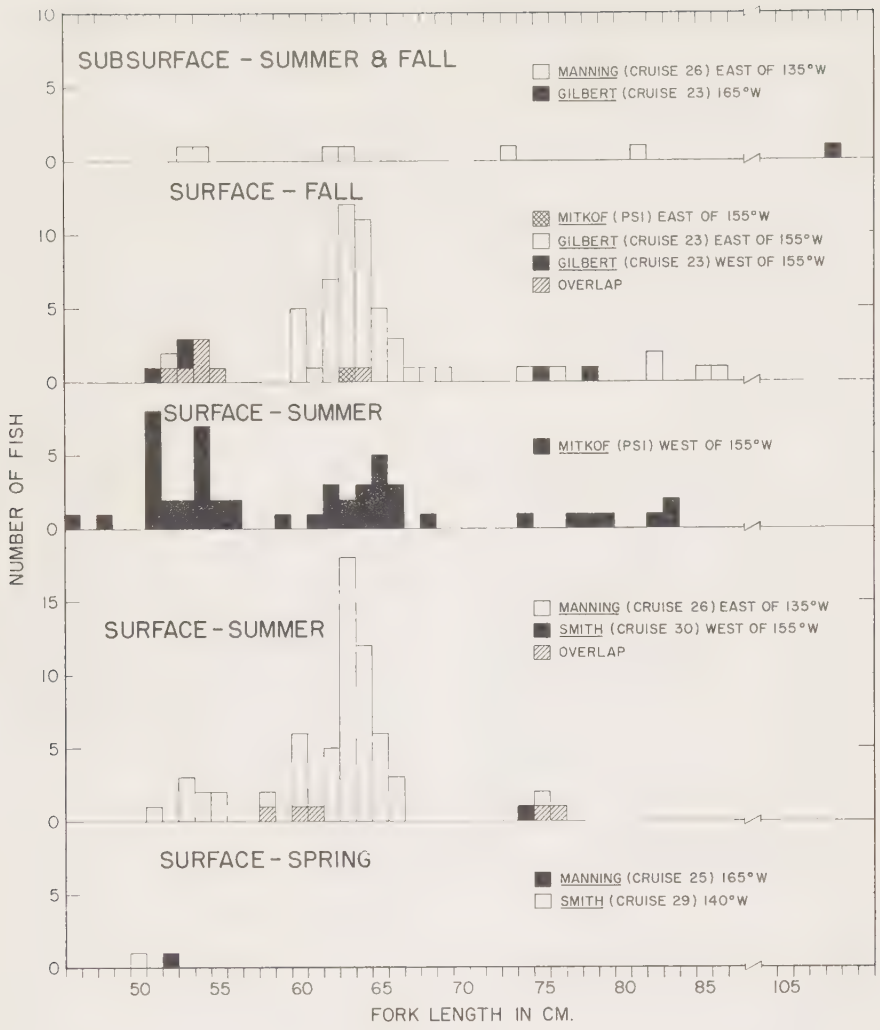


Figure 4.--Comparison of size frequencies of albacore taken in the eastern (open block) and central (filled block) sectors of the North Pacific, showing the degree of overlap (shaded block).

coast during 1950. The size range of 9 fish gill netted by the Gilbert (cruise 23) was 51.3 to 77.5 cm. fork length, which was similar to that of POFI's troll-caught fish (fig. 4).

Although only a few albacore were captured on longline gear, their size range (fig. 4) is of interest. Those taken on longline by the Manning in the eastern North Pacific were essentially the same size as troll-caught fish, while those taken in the central North Pacific were larger. All longline catches made by the Manning were in the same area as the troll catches, and 3 of the 6 fish caught were alive when landed. Two of these were in such good condition when landed, that they were tagged and released. It would appear that of the albacore taken with longline by the Manning, some were deep-swimming fish and others were captured near or at the surface during the retrieving of the gear. A somewhat similar situation was noted in longline catches made by the Paolina T. of the California Department of Fish and Game in the major California albacore grounds, 28°N.-33°N. latitude, 117°W.-122°W. longitude, southeast of the Manning's position (California 1956).

Surface and subsurface albacore caught in the central North Pacific vary in size from north to south. In the summer, surface fish captured between latitudes 45°N. and 48°N. had a size range between 46 cm. and 84 cm., with the bulk of the fish around 64 cm. in length (fig. 4). To the south (38°N.-41°N., 161°W.-180°), and roughly during the same period, August 1955, a Japanese longlining vessel captured 41 large albacore (Nomura 1956). The

smaller surface fish captured to the north by POFI vessels were, for the most part, not represented in the size range of these deep-swimming albacore. Of the 41 fish, 26.8 percent were 81-90 cm. in length, 41.5 percent were 91-100 cm., 17.1 percent were 101-110 cm., and 14.6 percent were 111-120 cm. A similar size contrast was noted between the Gilbert's troll and longline catches during the fall (fig. 4).

During all cruises albacore brought on deck in a viable condition were tagged and returned to the sea (the number tagged, by cruise, is shown in table 19, Appendix); thus there were few data available on the sexual development of the fish. All fish examined were immature, and their gonads had not developed sufficiently for the sexes to be distinguished accurately in the field.

## DISTRIBUTIONS OF OTHER FISHES

The seasonal shift in distribution and presumably in abundance noted for the albacore was also apparent in certain other species. Table 3 summarizes the northern seasonal limits at which other fishes were taken within the 140°W. and 150°W. longitudes. This area was chosen as a basis for comparison because it was the one most extensively surveyed during the 1955 cruises (see figs. 1, 2, and 3).

Bigeye tuna, Parathunnus sibi (Temminck and Schlegel), taken on longline gear, showed a progressive shift of their northern limit from approximately 31°N. in the spring to 37°N. in the fall. Although inclement weather during the fall cruise prevented an exact determination, the northward limit of bigeye along 145°W. longitude was somewhere between 37°38'N. and 46°07'N. latitude. An unusual concentration of bigeye was discovered during the spring cruise of the Smith. Fifty-five fish were captured with longline gear between 36°43'N., 143°42'W. and 25°14'N., 148°10'W. In this area a large school of tuna was observed, at a depth of 5 to 10 fathoms, following the boat and apparently feeding on the discarded longline baits. The school was identified by the field party as bigeye tuna. To the west of this catch the Manning (cruise 25) took bigeye in similar latitudes but in smaller numbers.

Skipjack tuna, Katsuwonus pelamis (Linnaeus), taken by both surface trolling and longlining, were not abundant in the catches. The catch data (table 3) showed a seasonal progression northward in their distribution from spring through fall. None was taken within longitudes 140°W. and 150°W. during the summer. To the east of this area they were found at approximately 38°40'N., 132°16'W. and to the west at approximately 43°23'N., 157°24'W. A single large school was observed at about 23°28'N., 159°40'W., during the fall cruise of the Gilbert. The school was composed of large 18- to 25-pound "season" fish.

Only a single yellowfin tuna, Neothunnus macropterus (Temminck and Schlegel), was captured on longline throughout these several cruises and it was taken during the spring. During the summer a large school of yellowfin was sighted on the surface at 35°40'N. latitude, 172°36'W. longitude, by a fisherman on the Smith (cruise 30).

Two fishes, the great blue shark, Prionace glauca (Linnaeus) and the lancet fish, Alepisaurus sp., showed a similar distinct seasonal shift in their distributions. As indicated by the catch rate, their numbers increased progressively northward from spring through fall.

The distribution of dolphin, Coryphaena hippurus (Linnaeus), appeared to shift southward during the fall. The evidence may be erroneous, however, since it was obtained under poor sampling conditions experienced during stormy weather on the northern portion of the eastern leg, along 145°W. longitude, of

Table 3.--Northern seasonal limits of tunas other than albacore and certain other fishes, within 140°W. and 150°W. longitude

| Season | Bigeye tuna | Skipjack tuna | Yellowfin tuna | Great blue shark 1/ | Lancet fish 1/ | Dolphin |
|---|---|---|---|---|---|---|
| Spring | 30°57'N. | 25°52'N. | 24°17'N. | 39°29'N. | 38°32'N. | 32°08'N. |
| Summer | 32°13'N. | - | - | 41°51'N. | 41°51'N. | 39°49'N. |
| Fall | 37°36'N. | 43°34'N. | - | 46°07'N. | 46°07'W. | 31°06'N. |

1/ Northern limits of largest catch of a single day

the Gilbert's fall cruise (23). On the western leg along 165°W. longitude, under better weather conditions, dolphin were taken as far north as 41°04'N. latitude. Catches were made on both troll and longline gear, often at the same positions.

## SUMMARY


1. Five cruises, 4 primarily fishing and 1 primarily oceanographic, were made during the spring, summer, and fall of 1955 to determine the distribution and abundance of albacore tuna to the north and northeast of the Hawaiian Islands.

2. Albacore were scarce in the above areas during the late spring but were relatively abundant during the late summer. The summer distribution was probably discontinuous from east to west, with concentrations in the eastern and central North Pacific sectors and a lack of fish between them. During the fall this intervening area contained albacore in relative abundance, suggesting that the discontinuity was either a transient condition or had diminished somewhat with the change in season.

3. Catches of surface-swimming and possibly those of deep-swimming albacore were associated with the Polar Front, a transition zone between Central Pacific and Subarctic waters. Surface catches were also associated with a seasonal latitudinal change in surface temperature, particularly about the isotherms 55° to 65°F.

4. Comparison of length frequencies of surface-caught albacore taken in the central and eastern sectors of the North Pacific showed that the same size ranges were sampled on either side of the east-west discontinuity noted above. Size ranges of surface-caught and subsurface-caught albacore were similar in the eastern sector, but the latter were, for the most part, larger in the central sector.

5. A latitudinal shift in occurrence, as noted for the albacore, was also displayed by other fishes.


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## APPENDIX

Table 4.--List of common and scientific names of fishes with the abbreviations used in Appendix tables 5 through 19

| | | |
|---|---|---|
| AL | Albacore tuna | Germo alalunga (Bonnaterre) |
| BC | Barracudina | Anatopterus sp. |
| BE | Bigeye tuna | Parathunnus sibi (Temminck and Schlegel) |
| BM | Black marlin | Makaira ampla (Poey) |
| BR | Bramid | Bramidae |
| CA | Carangid | Carangidae |
| DO | Dolphin | Coryphaena hippurus Linnaeus |
| GS | Great blue shark | Prionace glauca (Linnaeus) |
| LF | Lancet fish | Alepisaurus sp. |
| MS | Mackerel shark | Lamna ditropis Hubbs and Follett |
| BS | Bonito shark | Isurus glaucus Müller and Henle |
| MF | Moonfish | Lampris regius (Bonnaterre) |
| SN | Short-nosed spearfish | Tetrapterus angustirostris Tanaka |
| SJ | Skipjack tuna | Katsuwonus pelamis (Linnaeus) |
| SS | Soupfin shark | Galeorhinus zyopterus Jordan and Gilbert |
| SM | Striped marlin | Makaira mitsukurii (Jordan and Snyder) |
| WM | Silver or white marlin | Istiompax marlina (Jordan and Hill) |
| WA | Wahoo | Acanthocybium solandri (Cuvier and Valenciennes) |
| YF | Yellowfin tuna | Neothunnus macropterus (Temminck and Schlegel) |

Table 5.--Summary of surface trolling, John R. Manning cruise 25

| Date 1955 | Within positions | | | | Hours trolled | Number of line hours | Catch | Lost, identified | Speed, knots |
|---|---|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | N. Lat. | W. Long. | | | | | |
| 5/2 | 21°15' | 158°00' | 24°00' | 166°20' | 3 | 6 | 1 YF | - | 8 |
| 5/3 | 21°15' | 158°00' | 24°00' | 166°20' | 12 | 24 | 3 DO | - | 8 |
| 5/4 | 21°15' | 158°00' | 24°00' | 166°20' | 11.5 | 23 | - | - | 9 |
| 5/5 | 24°00' | 166°20' | 25°50' | 174°00' | 1.5 | 3 | - | - | 6 |
| 5/6 | 24°00' | 166°20' | 25°50 | 174°00' | 13 | 26 | - | - | 8 |
| 5/7 | 24°00' | 166°20' | 25°50' | 174°00' | 13 | 26 | - | - | 9 |
| 5/8 | No trolling | | | | - | - | - | - | - |
| 5/9 | 25°50' | 174°00' | 28°15' | 177°30' | 12 | 24 | - | - | 8.5 |
| 5/10 | 28°15' | 177°30' | 28°14' | 175°05' | 2 | 4 | - | - | 8.5 |
| 5/11 | 28°15' | 177°30' | 28°14' | 175°05' | 4 | 20.5 | - | - | 8 |
| 5/12 | 28°14' | 175°05' | 28°41' | 174°59' | 5.5 | 33 | - | - | 6 |
| 5/13 | 29°40' | 175°12' | 30°15' | 175°12' | 6 | 36 | - | - | 6 |
| 5/14 | 31°24' | 175°07' | 31°57' | 175°04' | 6 | 36 | - | - | 6.5-7 |
| 5/15 | 33°01' | 175°00' | 33°30' | 174°59' | 6 | 36 | 1 DO | - | 6-6.5 |
| 5/16 | 34°29' | 175°03' | 35°09' | 175°02' | 6.5 | 39 | - | - | 6.5 |
| 5/17 | 36°06' | 174°58' | 36°47' | 175°04' | 6.5 | 39 | - | - | 6.5 |
| 5/18 | 37°54' | 174°46' | 38°36' | 174°52' | 6 | 36 | - | - | 6 |
| 5/19 | 39°32' | 174°37' | 36°50' | 171°59' | 6 | 36 | - | - | 6 |
| 5/20 | 39°32' | 174°37' | 36°50' | 171°59' | 14 | 84 | - | - | 6.5 |
| 5/21 | 36°50' | 171°59' | 31°36' | 165°16' | 13 | 78 | - | - | 6 |
| 5/22 | 36°50' | 171°59' | 31°36' | 165°16' | 14 | 84 | - | - | 6.5 |
| 5/23 | 36°50' | 171°59' | 31°36' | 165°16' | 14 | 84 | - | - | 6 |
| 5/24 | 31°36' | 165°16' | 33°40' | 165°32' | 7 | 42 | - | - | 6 |
| 5/25 | 33°40' | 165°32' | 35°28' | 164°54' | 6.5 | 39 | 4 DO | - | 6 |
| 5/26 | 35°28' | 164°54' | 36°54' | 165°13' | 5.5 | 33 | 1 DO, 1 AL | - | 6 |
| 5/27 | 36°54' | 165°13' | 39°01' | 165°10' | 6.5 | 39 | - | - | 6 |
| 5/28 | 39°01' | 165°10' | 40°54' | 164°54' | 6.5 | 39 | - | - | 6 |
| 5/29 | 40°54' | 164°54' | 29°04' | 160°01' | 6 | 36 | - | - | 6 |
| 5/30 | 40°54' | 164°54' | 29°04' | 160°01' | 13.5 | 81 | - | - | 6 |
| 5/31 | 40°54' | 164°54' | 29°04' | 160°01' | 14 | 84 | - | - | 6 |
| 6/1 | 40°54' | 164°54' | 29°04' | 160°01' | 13.5 | 81 | 4 DO | 1 DO | 6.5 |
| 6/2 | 40°54' | 164°54' | 29°04' | 160°01' | 14 | 84 | 2 DO | - | 6.5 |
| 6/3 | 29°04' | 160°01' | 27°05' | 159°30' | 5 | 30 | - | - | 7 |
| 6/4 | 27°05' | 159°30' | 25°23' | 159°00' | 7 | 42 | 4 DO | 5 DO | 6.5-7 |
| 6/5 | 25°23' | 159°00' | 23°28' | 158°33' | 7 | 42 | 1 DO | - | 6 |
| 6/6 | 23°28' | 158°33' | 21°15' | 158°00' | 2 | 12 | - | - | 6 |
| Totals | | | | | 289.5 | 1,461.5 | 1 YF<br>20 DO<br>1 AL | 6 DO | |

Table 6.--Catch record, 5-fathom floatline gear, John R. Manning cruise 25

| Position | | Tuna | | | GS | LF | Miscellaneous |
|---|---|---|---|---|---|---|---|
| N. Lat. | W. Long. | AL | BE | Others | | | |
| 28°14' | 175°05' | - | - | - | 3 | - | 1 SM, 4 DO |
| 29°40' | 175°12' | - | - | - | - | 1 | 1 SM |
| 31°24' | 175°07' | - | - | - | 6 | - | 3 DO |
| 33°01' | 175°00' | - | - | - | 6 | - | - |
| 34°29' | 175°03' | - | - | - | 8 | 2 | - |
| 36°06' | 174°58' | - | - | - | 14 | 4 | - |
| 37°54' | 174°46' | - | - | - | 34 | - | 6 BS, 2 MS |
| 39°32' | 174°37' | - | - | - | 6 | 4 | - |
| 31°36' | 165°16' | - | - | - | 2 | - | - |
| 33°40' | 165°32' | - | - | - | 5 | 1 | 2 DO |
| 35°28' | 164°54' | - | - | - | 16 | 3 | - |
| 36°54' | 165°13' | - | - | - | 22 | 1 | - |
| 39°01' | 165°10' | - | - | - | 6 | 2 | 5 MS |
| 40°54' | 164°54' | - | - | - | 1 | 2 | 3 MS |
| 29°04' | 160°01' | - | 2 | - | 1 | - | 1 SM |
| 27°05' | 159°30' | - | - | - | - | - | 1 WM, 1 DO |
| 25°23' | 159°00' | - | 1 | - | 2 | - | 1 DO |
| 23°28' | 158°33' | - | - | - | - | - | 1 BS |
| Totals | | - | 3 | - | 132 | 20 | 3 SM<br>11 DO<br>7 BS<br>10 MS<br>1 WM |

Table 7.--Catch record, 15-fathom floatline gear, John R. Manning cruise 25

| Position | | Tuna | | | GS | LF | Miscellaneous |
|---|---|---|---|---|---|---|---|
| N. Lat. | W. Long. | AL | BE | Others | | | |
| 28°14' | 175°05' | - | - | - | - | 1 | - |
| 29°40' | 175°12' | - | - | - | 1 | - | 1 DO |
| 31°24' | 175°07' | - | - | - | 5 | 3 | - |
| 33°01' | 175°00' | - | - | - | - | - | - |
| 34°29' | 175°03' | - | - | - | 4 | 1 | - |
| 36°06' | 174°58' | - | - | - | 7 | 3 | - |
| 37°54' | 174°46' | - | - | - | 12 | 3 | - |
| 39°32' | 174°37' | - | - | - | 3 | 1 | 2 MS, 1 BR |
| 31°36' | 165°16' | - | - | - | 3 | - | - |
| 33°40' | 165°32' | - | - | - | 2 | - | 2 DO |
| 35°28' | 164°54' | - | - | - | 7 | - | - |
| 36°54' | 165°13' | - | - | - | 22 | 2 | - |
| 39°01' | 165°10' | - | - | - | 16 | - | 4 MS |
| 40°54' | 164°54' | - | - | - | 1 | - | 6 MS |
| 29°04' | 160°01' | - | 2 | - | 2 | - | - |
| 27°05' | 159°30' | - | 2 | - | - | 1 | 1 DO |
| 25°23' | 159°00' | - | - | - | 1 | - | 6 DO |
| 23°28' | 158°33' | - | - | - | 1 | 1 | - |
| Totals | | - | 4 | - | 87 | 16 | 10 DO<br>12 MS<br>1 BR |

Table 8.--Summary of surface trolling, Hugh M. Smith cruise 29

| Date 1955 | Within positions | | | | Hours trolled | Number of line hours | Catch | Speed, knots |
|---|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | N. Lat. | W. Long. | | | | |
| 5/3 | 21°15' | 158°00' | 28°25' | 155°04' | 11 | 22 | 2 DO | 8 |
| 5/4 | 21°15' | 158°00' | 28°25' | 155°04' | 12.5 | 25 | - | 8 |
| 5/5 | 28°25' | 155°04' | 28°48' | 154°57' | 2 | 12 | - | 6 |
| 5/6 | 30°03' | 155°10' | 30°24' | 154°56' | 4.5 | 27 | - | 6 |
| 5/7 | 31°59' | 154°46' | 32°27' | 154°40' | 5.5 | 33 | - | 6 |
| 5/8 | 33°59' | 154°48' | 34°22' | 154°52' | 5 | 30 | - | 6 |
| 5/9 | 35°51' | 154°52' | 36°21' | 154°52' | 4.5 | 27 | - | 6 |
| 5/10 | 37°41' | 154°49' | 38°20' | 154°54' | 5 | 30 | - | 6 |
| 5/11 | 38°17' | 154°43' | 38°52' | 154°40' | 4.5 | 27 | - | 6 |
| 5/12 | 40°02' | 155°03' | 42°26' | 154°54' | 5 | 30 | - | 6 |
| 5/13 | 42°26' | 154°54' | 40°18' | 153°12' | 5 | 30 | - | 6 |
| 5/14 | 42°26' | 154°54' | 40°18' | 153°12' | 12.5 | 75 | - | 6 |
| 5/15 | 40°18' | 153°12' | 34°36' | 149°22' | 12.5 | 75 | - | 6 |
| 5/16 | 40°18' | 153°12' | 34°36' | 149°22' | 13.5 | 81 | - | 7 |
| 5/17 | 32°08' | 147°20' | 32°29' | 147°16' | 4 | 24 | 1 DO | 6 |
| 5/18 | 33°44' | 146°47' | 34°29' | 146°56' | 5 | 30 | - | 6 |
| 5/19 | 35°42' | 147°29' | 36°24' | 147°11' | 5.5 | 33 | - | 6 |
| 5/20 | 37°48' | 146°49' | 38°31' | 146°56' | 5 | 30 | - | 6 |
| 5/21 | 39°51' | 146°42' | 40°21' | 146°40' | 5 | 30 | - | 6 |
| 5/22 | 41°50' | 147°00' | 41°19' | 146°28' | 3 | 18 | - | 6.5 |
| 5/23 | 39°49' | 145°19' | 36°29' | 144°44' | 13 | 78 | - | 6.5 |
| 5/24 | 36°29' | 144°44' | 34°03' | 142°09' | 13 | 78 | - | 6 |
| 5/25 | 34°03' | 142°09' | 37°21' | 140°47' | 13 | 78 | - | 6 |
| 5/26 | 37°21' | 140°47' | 40°38' | 139°06' | 13 | 78 | - | 6 |
| 5/27 | 40°38' | 139°06' | 41°39' | 139°02' | 13.5 | 81 | - | 6.5 |
| 5/28 | 40°38' | 139°06' | 41°39' | 139°02' | 13 | 78 | - | 6 |
| 5/29 | 40°38' | 139°06' | 41°39' | 139°02' | 13.5 | 81 | - | 6 |
| 5/30 | 41°39' | 139°02' | 39°29' | 139°00' | 12 | 72 | - | 6 |
| 5/31 | 39°29' | 139°00' | 38°52' | 138°58' | 4.5 | 27 | - | 6 |
| 6/1 | 37°18' | 139°00' | 36°40' | 138°58' | 5 | 30 | - | 6 |
| 6/2 | 35°13' | 138°47' | 33°02' | 139°07' | 5 | 30 | - | 6-6.5 |
| 6/3 | 33°02' | 139°07' | 30°57' | 139°04' | 5 | 30 | - | 6 |
| 6/4 | 30°57' | 139°04' | 28°56' | 139°07' | 5 | 30 | - | 6 |
| 6/5 | 28°56' | 139°07' | 27°55' | 141°28' | 6.5 | 39 | 1 DO, 1 AL | 6 |
| 6/6 | 27°55' | 141°28' | 26°43' | 143°42' | 5.5 | 33 | 1 DO | 6 |
| 6/7 | 26°43' | 143°42' | 25°52' | 145°50' | 5 | 30 | - | 6 |
| 6/8 | 25°52' | 145°50' | 25°14' | 148°10' | 4 | 24 | - | 6 |
| 6/9 | 25°14' | 148°10' | 24°17' | 150°16' | 4 | 24 | 1 DO | 6 |
| 6/10 | 24°17' | 150°16' | 23°30' | 152°39' | 5 | 30 | - | 6 |
| 6/11 | 23°30' | 152°39' | 22°38' | 154°46' | 5 | 30 | 1 DO | 6 |
| 6/12 | 22°38' | 154°46' | 22°02' | 156°13' | 5 | 30 | - | 6 |
| 6/13 | 22°02' | 156°13' | 21°15' | 158°00' | 2 | 12 | - | 6 |
| 6/13 | 22°02' | 156°13' | 21°15' | 158°00' | 2 | 4 | - | 8 |
| Totals | | | | | 303 | 1,716 | 7 DO<br>1 AL | |

Table 9.--Catch record, 5-fathom floatline gear, Hugh M. Smith cruise 29

| Position | | Tuna | | | GS | LF | Miscellaneous |
|---|---|---|---|---|---|---|---|
| N. Lat. | W. Long. | AL | BE | Others | | | |
| 28°25' | 155°04' | - | 1 | - | 1 | - | 1 BS |
| 30°03' | 155°10' | - | 1 | - | - | - | 1 DO |
| 31°59' | 154°46' | - | - | - | 1 | - | 1 BS |
| 33°59' | 154°48' | - | - | - | 1 | - | - |
| 35°51' | 154°52' | - | - | - | 1 | 3 | 1 MF |
| 37°41' | 154°49' | - | - | - | 11 | 1 | - |
| 38°17' | 154°43' | - | - | - | 20 | 5 | - |
| 40°02' | 155°03' | - | - | - | 4 | 4 | 1 MS |
| 42°26' | 154°54' | - | - | - | - | 6 | 1 MS |
| 32°08' | 147°20' | - | - | - | - | 1 | 1 DO |
| 33°44' | 146°47' | - | - | - | - | - | - |
| 35°42' | 147°29' | - | - | - | - | 3 | - |
| 37°48' | 146°49' | - | - | - | - | - | - |
| 39°51' | 146°42' | - | - | - | 18 | 7 | - |
| 41°50' | 147°00' | - | - | - | 3 | 6 | - |
| 41°39' | 139°02' | - | - | - | 14 | 5 | - |
| 39°29' | 139°00' | - | - | - | 34 | 2 | - |
| 37°18' | 139°00' | - | - | - | 1 | 5 | - |
| 35°13' | 138°47' | - | - | - | 1 | 2 | - |
| 33°02' | 139°07' | - | - | - | 3 | 5 | - |
| 30°57' | 139°04' | - | 2 | - | - | 1 | - |
| 28°56' | 139°07' | - | - | - | - | 1 | - |
| 27°55' | 141°28' | - | - | - | - | - | 1 DO |
| 26°43' | 143°42' | - | 8 | - | - | 1 | 1 DO |
| 25°52' | 145°50' | - | 3 | 1 SJ | - | - | 1 BS |
| 25°14' | 148°10' | - | 8 | - | - | 3 | 2 DO |
| 24°17' | 150°16' | - | - | - | - | - | 2 BS, 5 DO, 1 WA |
| 23°30' | 152°39' | - | - | - | - | 3 | 1 SN, 1 DO |
| 22°38' | 154°46' | - | 2 | - | 1 | 2 | 1 DO |
| 22°02' | 156°13' | - | - | - | 2 | - | - |
| Totals | | - | 25 | 1 SJ | 116 | 66 | 5 BS<br>13 DO<br>1 MF<br>2 MS<br>1 WA<br>1 SN |

Table 10.--Catch record, 15-fathom floatline gear, Hugh M. Smith, cruise 29

| Position | | Tuna | | | GS | LF | Miscellaneous |
|---|---|---|---|---|---|---|---|
| N. Lat. | W. Long. | AL | BE | Others | | | |
| 28°25' | 155°04' | - | 3 | - | 3 | 1 | 1 turtle |
| 30°03' | 155°10' | - | - | - | - | - | 3 DO |
| 31°59' | 154°46' | - | - | - | - | 1 | - |
| 33°59' | 154°48' | - | - | - | 2 | 1 | - |
| 35°51' | 154°52' | - | - | - | - | 7 | - |
| 37°41' | 154°49' | - | - | - | 8 | 5 | - |
| 38°17' | 154°43' | - | - | - | 16 | 7 | 1 MS |
| 40°02' | 155°03' | - | - | - | 5 | 2 | 3 MS |
| 42°26' | 154°54' | - | - | - | - | 2 | - |
| 32°08' | 147°20' | - | - | - | 2 | - | 2 DO |
| 33°44 | 146°47' | - | - | - | - | 1 | - |
| 35°42' | 147°29' | - | - | - | 2 | 4 | - |
| 37°48' | 146°49' | - | - | - | 1 | 5 | - |
| 39°51' | 146°39' | - | - | - | 15 | 5 | - |
| 41°50' | 147°00' | - | - | - | 3 | 11 | - |
| 41°39' | 139°02' | - | - | - | 8 | 12 | - |
| 39°29' | 139°00' | - | - | - | 23 | 6 | - |
| 37°18' | 139°00' | - | - | - | 4 | 2 | 1 MF |
| 35°13' | 138°47' | - | - | - | - | 6 | - |
| 33°02' | 139°07' | - | - | - | 4 | 2 | 1 BS |
| 30°57' | 139°04' | - | 2 | - | - | - | - |
| 28°56' | 139°07' | - | - | - | - | 3 | - |
| 27°55' | 141°28' | - | 1 | - | - | - | 3 DO |
| 26°43' | 143°42' | - | 7 | - | - | - | - |
| 25°52' | 145°50' | - | 21 | - | 1 | 1 | 1 SM, 1 SN |
| 25°14' | 148°10' | - | 4 | - | - | 2 | - |
| 24°17' | 150°16' | - | 1 | 1 YF | 1 | 3 | - |
| 23°30' | 152°39' | - | 2 | - | - | 1 | 1 BS |
| 22°38' | 154°46' | - | 1 | - | - | - | 1 DO |
| 22°02' | 156°13' | - | - | - | 2 | 1 | - |
| Totals | | - | 42 | 1 YF | 100 | 91 | 1 turtle<br>9 DO<br>4 MS<br>1 MF<br>2 BS<br>1 SM<br>1 SN |

Table 11.--Summary of surface trolling, Hugh M. Smith cruise 30

| Date 1955 | Within positions | | | | Hours trolled | Number of line hours | Catch | Lost, identified | Lost, unidentified | Speed knots |
|---|---|---|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | N. Lat. | W. Long. | | | | | | |
| 7/16 | 21°15' | 158°00' | 23°31' | 161°06' | 9 | 36 | - | - | - | 8 |
| 7/17 | 24°01' | 162°15' | 24°51' | 164°01' | 3 | 9 | - | - | - | 9 |
| 7/18 | 25°20' | 165°10' | 26°00' | 166°40' | 9 | 27 | - | - | - | 9 |
| 7/19 | 26°21' | 168°14' | 27°10' | 170°29' | 9 | 27 | - | - | - | 9 |
| 7/20 | 27°13' | 171°30' | 27°43' | 173°50' | 9 | 27 | - | - | - | 9 |
| 7/21 | 27°57' | 175°04' | 28°28' | 177°45' | 11 | 33 | 1 WA | - | - | 9 |
| 7/24 | 29°02' | 178°40' | 30°06' | 179°54' | 10 | 30 | - | - | - | 9 |
| 7/25 | 31°12' | 179°55' | 33°08' | 179°57' | 10 | 30 | - | - | - | 9 |
| 7/26 | 34°10' | 179°58' | 35°43' | 179°51' | 10 | 30 | - | - | - | 9 |
| 7/27 | 37°15' | 179°50' | 39°19' | 179°51' | 10 | 30 | - | - | - | 9 |
| 7/28 | 40°19' | 179°54' | 41°50' | 179°54' | 10 | 30 | - | - | - | 9 |
| 7/29 | 43°19' | 179°51' | 44°56' | 179°49' | 9 | 27 | - | - | - | 9 |
| 7/30 | 46°06' | 179°50' | 47°41' | 179°39' | 11 | 33 | - | - | - | 9 |
| 7/31 | 49°29' | 179°59' | 49°32' | 178°22' | 8.5 | 25.5 | - | - | - | 9 |
| 8/1 | 49°30' | 176°32' | 49°29' | 173°21' | 7 | 21 | - | - | - | 9 |
| 8/2 | 49°02' | 172°32' | 47°30' | 172°30' | 11 | 33 | - | - | - | 9 |
| 8/3 | 46°00' | 172°34' | 45°05' | 172°30' | 2 | 6 | 1 AL | - | - | 7-8 |
| 8/4 | 43°30' | 172°20' | 41°39' | 172°16' | 11 | 33 | - | - | - | 7-8 |
| 8/5 | 40°23' | 172°33' | 39°02' | 172°30' | 12 | 36 | - | - | - | 9 |
| 8/6 | 37°23' | 172°29' | 35°26' | 172°36' | 13 | 39 | - | - | - | 9 |
| 8/7 | 34°20' | 172°35' | 32°13' | 172°26' | 12 | 36 | 4 DO | - | - | 9 |
| 8/8 | 30°55' | 172°24' | 30°09' | 171°53' | 12 | 36 | - | - | - | 8 |
| 8/9 | 29°57' | 170°40' | 29°53' | 168°50' | 12 | 48 | - | - | - | 8 |
| 8/10 | 29°51' | 167°30' | 29°55' | 165°38' | 12 | 60 | - | - | - | 8 |
| 8/11 | 30°30' | 164°47' | 32°36' | 164°55' | 12 | 60 | - | - | - | 8 |
| 8/12 | 33°30' | 164°52' | 35°36' | 164°55' | 14 | 70 | - | - | - | 8 |
| 8/13 | 37°04' | 164°55' | 39°00' | 164°59' | 9 | 27 | - | - | - | 8 |
| 8/14 | 40°30' | 165°01' | 42°03' | 164°52' | 9 | 27 | - | - | - | 8 |
| 8/15 | 43°30' | 164°55' | 44°57' | 165°01' | 8 | 24 | - | - | - | 8 |
| 8/16 | 46°30' | 165°00' | 48°04' | 164°55' | 11 | 33 | - | - | - | 4 |
| 8/17 | 49°00' | 164°58' | 49°35' | 163°24' | 15 | 45 | - | - | - | 7 |
| 8/18 | 49°42' | 161°43' | 49°36' | 158°14' | 17 | 85 | - | - | - | 9 |
| 8/19 | 48°57' | 157°24' | 47°30' | 157°16' | 16 | 80 | 4 AL | - | - | 7 |
| 8/20 | 46°00' | 157°03' | 44°57' | 157°26' | 16 | 80 | 2 AL | - | 2 | 7 |
| 8/21 | 43°23' | 157°24' | 41°30' | 157°24' | 14 | 70 | 1 SJ | 4 SJ | - | 9 |
| 8/22 | 40°27' | 157°31' | 38°30' | 157°30' | 14 | 70 | - | - | - | 9 |
| 8/23 | 37°00' | 157°30' | 35°00' | 157°30' | 14 | 70 | 4 DO | - | - | 9 |
| 8/24 | 34°00' | 157°33' | 32°00' | 157°30' | 14 | 70 | - | - | - | 9 |
| 8/25 | 31°00' | 157°30' | 29°00' | 157°30' | 13 | 65 | - | - | - | 9 |
| 8/26 | 28°00' | 157°35' | 26°00' | 157°30' | 13 | 65 | 2 DO | - | - | 9 |
| 8/27 | 24°52' | 157°33' | 23°00' | 157°31' | 13 | 65 | - | - | - | 9 |
| 8/28 | 22°00' | 157°35' | 21°15' | 158°00' | 8 | 40 | - | - | - | 9 |
| Totals | | | | | 462.5 | 1,788.5 | 1 WA<br>7 AL<br>10 DO<br>1 SJ | 4 SJ | 2 | |

Table 12.--Summary of surface trolling, John R. Manning cruise 26

| Date 1955 | Within positions | | | | Hours trolled | Number of line hours | Catch | Lost, identified | Lost, unidentified | Speed, knots |
|---|---|---|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | N. Lat. | W. Long. | | | | | | |
| 7/17 | 21°15' | 158°00' | 30°51' | 151°56' | 3 | 6 | - | - | - | 7.5 |
| 7/17 | 21°15' | 158°00' | 30°51' | 151°56' | 9.5 | 28.5 | - | - | - | 7.5 |
| 7/18 | 21°15' | 158°00' | 30°51' | 151°56' | 13.5 | 67.5 | 4 DO | - | - | 7.5 |
| 7/19 | 30°51' | 151°56' | 32°13' | 151°12' | 5.5 | 33 | 4 DO | - | - | 6 |
| 7/20 | 32°13' | 151°12' | 32°46' | 150°51' | 4 | 24 | 1 DO | - | - | 6 |
| 7/20 | 32°13' | 151°12' | 32°46' | 150°51' | 1.5 | 9 | - | - | - | 8 |
| 7/21 | 33°48' | 150°32' | 34°23' | 150°07' | 1.5 | 9 | - | - | - | 6 |
| 7/21 | 33°48' | 150°32' | 34°23' | 150°07' | 3.5 | 21 | - | - | - | 8 |
| 7/22 | 35°29' | 149°45' | 36°11' | 149°00' | 2 | 12 | - | - | - | 6 |
| 7/22 | 35°29' | 149°45' | 36°11' | 149°00' | 4 | 24 | 5 DO | - | - | 8 |
| 7/23 | 36°59' | 148°35' | 37°39' | 147°55' | 7 | 42 | - | - | - | 6 |
| 7/24 | 38°32' | 147°16' | 39°09' | 146°45' | 7 | 42 | - | - | - | 6 |
| 7/25 | 39°49' | 146°25' | 40°26' | 145°52' | 7 | 42 | - | - | - | 6 |
| 7/26 | 41°03' | 145°05' | 41°42' | 144°49' | 7 | 42 | - | - | - | 6 |
| 7/27 | 41°51' | 144°51' | 42°35' | 144°02' | 6.5 | 39 | - | - | - | 6 |
| 7/28 | 43°31' | 143°21' | 44°06' | 142°45' | 6.5 | 39 | - | - | - | 6 |
| 7/29 | 44°49' | 142°10' | 44°49' | 142°10' | 13.5 | 81 | - | - | - | 6 |
| 7/30 | 46°22' | 141°50' | 47°01' | 140°30' | 14.5 | 87 | - | - | - | 6 |
| 7/31 | 47°31' | 140°38' | 46°59' | 139°53' | 7 | 42 | - | - | - | 6 |
| 8/1 | 46°19' | 139°08' | 45°49' | 138°19' | 8 | 48 | - | - | - | 6-7 |
| 8/2 | 45°18' | 137°34' | 44°42' | 136°56' | 6 | 36 | - | - | - | 6 |
| 8/3 | 43°56' | 136°10' | 42°19' | 135°22' | 6.5 | 39 | - | - | - | 6 |
| 8/4 | 42°29' | 134°40' | 42°10' | 134°23' | 6.5 | 39 | 1 AL | - | - | 6 |
| 8/5 | 41°26' | 133°48' | 41°03' | 133°12' | 7 | 42 | 2 AL | 2 AL | - | 6 |
| 8/6 | 40°53' | 133°03' | 41°36' | 132°19' | 7 | 42 | 1 AL | 2 AL | - | 6.5 |
| 8/7 | 42°08' | 131°30' | 42°48' | 130°41' | 8 | 48 | 9 AL | 8 AL | - | 6.5 |
| 8/8 | 43°25' | 130°00' | 42°55' | 128°58' | 7 | 42 | - | - | - | 6.5 |
| 8/9 | 42°31' | 128°31' | 41°39' | 126°41' | 7.5 | 45 | - | 4 AL | - | 6.5 |
| 8/10 | 41°39' | 126°41' | 41°03' | 127°26' | 6.5 | 39 | - | 2 AL | - | 6.5 |
| 8/11 | 40°17' | 128°18' | 39°52' | 127°11' | 7 | 42 | 3 AL | 1 AL | - | 6.5 |
| 8/12 | 39°52' | 127°11' | 39°52' | 127°11' | 12 | 72 | 35 AL | 18 AL | - | 3.5-7 |
| 8/20 | 38°49' | 124°57' | 38°49' | 124°57' | 13 | 78 | - | - | - | 3.5-7 |
| 8/21 | 36°52' | 123°37' | 36°24' | 123°08' | 6 | 36 | - | - | - | 6.5 |
| 8/22 | 36°01' | 122°59' | 35°02' | 122°15' | 1 | 6 | - | - | - | 3.5-7 |
| 8/22 | 36°01' | 122°59' | 35°02' | 122°15' | 3 | 18 | 3 AL | 2 AL | - | 6.5 |
| 8/23 | 35°02' | 122°15' | 35°03' | 123°47' | 6 | 36 | - | 1 AL | - | 6.5 |
| 8/24 | 35°03' | 123°47' | 34°52' | 125°14' | 13 | 78 | 6 AL | 3 AL | - | 4-7 |
| 8/25 | 34°52' | 125°14' | 34°58' | 126°48' | 6.5 | 39 | - | 1 AL | - | 6.5 |
| 8/26 | 34°58' | 126°48' | 34°55' | 128°33' | 6 | 36 | 1 AL | 1 AL | - | 6.5 |
| 8/27 | 34°55' | 128°33' | 35°00' | 129°12' | 5 | 30 | - | - | - | 6.5 |
| 8/28 | 34°47' | 130°17' | 35°32' | 130°23' | 5 | 30 | - | - | - | 6.5 |
| 8/29 | 36°20' | 131°04' | 36°55' | 131°15' | 5 | 30 | - | 1 DO | - | 6.5 |
| 8/30 | 37°39' | 131°33' | 38°03' | 131°52' | 5.5 | 33 | 1 AL | - | - | 6.5 |
| 8/31 | 38°43' | 132°16' | 37°22' | 134°09' | 5.5 | 33 | 2AL,1SJ | - | 1 | 6.5 |
| 9/1 | 37°22' | 134°09' | 35°44' | 135°58' | 5 | 30 | - | - | - | 6.5 |
| 9/2 | 35°44' | 135°58' | 34°13' | 137°44' | 5 | 30 | 1 SN | - | - | 6-6.5 |
| 9/3 | 34°13' | 137°44' | 32°26' | 139°07' | 5 | 30 | - | 2 DO | - | 6.5 |
| 9/4 | 32°26' | 139°07' | 30°48' | 140°46' | 5 | 30 | - | 3 DO | - | 6.5 |
| 9/4 | 32°26' | 139°07' | 30°48' | 140°46' | 0.5 | 3 | - | - | - | 9 |
| 9/5 | 30°48' | 140°46' | 29°41' | 143°01' | 5 | 30 | - | - | - | 6.5 |
| 9/5 | 30°48' | 140°46' | 29°41' | 143°01' | 1 | 6 | - | - | - | 9 |
| 9/6 | 29°41' | 143°01' | 21°15' | 158°00' | 2 | 12 | 1 DO | 2 DO | - | 6.5 |
| 9/6 | 29°41' | 143°01' | 21°15' | 158°00' | 4.5 | 27 | - | - | - | 9 |
| 9/7 | 29°41' | 143°01' | 21°15' | 158°00' | 12.5 | 75 | - | - | - | 9-9.5 |

Table 12.--Summary of surface trolling, John R. Manning cruise 26 (cont'd)

| Date 1955 | Within positions | | | | Hours trolled | Number of line hours | Catch | Lost, identified | Lost, un- identified | Speed, knots |
|---|---|---|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | N. Lat. | W. Long. | | | | | | |
| 9/8 | 29°41' | 143°01' | 21°15' | 158°00' | 12.5 | 75 | - | - | - | 9-9.5 |
| 9/9 | 29°41' | 143°01' | 21°15' | 158°00' | 12.5 | 75 | - | - | - | 9-9.5 |
| 9/10 | 29°41' | 143°01' | 21°15' | 158°00' | 12 | 36 | 3SJ, 1 DO | - | - | 9-9.5 |
| Totals | | | | | 376 | 2,166 | 16 DO<br>64 AL<br>4 SJ<br>1 SN | 45 AL<br>8 DO | 1 | |

Table 13.--Catch record, 5-fathom floatline gear, John R. Manning cruise 26

| Position | | Tuna | | | GS | LF | Miscellaneous |
|---|---|---|---|---|---|---|---|
| N. Lat. | W. Long. | AL | BE | Others | | | |
| 30°51' | 151°56' | - | 3 | - | 1 | 1 | 1 DO |
| 32°13' | 151°12' | - | - | - | 1 | - | 3 DO |
| 33°48' | 150°32' | - | - | - | - | 2 | 2 DO |
| 35°29' | 149°45' | - | - | - | - | - | - |
| 36°59' | 148°35' | - | - | - | 1 | 2 | 1 DO, 1 SN |
| 38°32' | 147°16' | - | - | - | 2 | 9 | - |
| 39°49' | 146°25' | - | - | - | 2 | 5 | 1 SM, 2 DO |
| 41°03' | 145°05' | - | - | - | 7 | 4 | - |
| 41°51' | 144°26' | - | - | - | 54 | - | - |
| 43°31' | 143°21' | - | - | - | 24 | 1 | - |
| 47°31' | 140°38' | - | - | - | 3 | 1 | 1 MS |
| 46°19' | 139°08' | - | - | - | 15 | - | 3 BR, 1 MS |
| 45°18' | 137°34' | - | - | - | 19 | 2 | - |
| 43°56' | 136°10' | - | - | - | 2 | 2 | - |
| 42°29' | 134°40' | - | - | - | 4 | 2 | 1 MS |
| 41°26' | 133°48' | - | - | - | 30 | - | - |
| 40°53' | 133°03' | - | - | - | 14 | - | - |
| 42°08' | 131°30' | - | - | - | 14 | 2 | - |
| 43°25' | 130°00' | - | - | - | 6 | 2 | - |
| 42°31' | 128°31' | - | - | - | 20 | - | - |
| 41°39' | 126°41' | - | - | - | 36 | - | - |
| 40°17' | 128°18' | - | - | - | 61 | - | - |
| 36°52' | 123°37' | - | - | - | 37 | - | 2 SS, 1 BC |
| 36°01' | 122°59' | - | - | - | 15 | - | 1 MF |
| 35°02' | 122°15' | - | - | - | 33 | - | 1 MF, 1 CA |
| 34°52' | 125°14' | - | - | - | 7 | 2 | - |
| 34°58' | 126°48' | 1 | - | - | 7 | - | - |
| 34°55' | 128°33' | - | - | - | - | 4 | 1 MF |
| 34°47' | 130°17' | - | 3 | - | - | 1 | 1 BS |
| 36°20' | 131°04' | - | - | - | 2 | - | - |
| 37°39' | 131°33' | - | - | - | 3 | - | - |
| 38°43' | 132°16' | - | - | - | 4 | 2 | - |
| 37°22' | 134°09' | - | - | - | - | 10 | 6 DO |
| 35°44' | 135°58' | - | 1 | - | 1 | 1 | 9 DO |
| 34°13' | 137°44' | - | - | - | - | 2 | 1 DO |
| 32°26' | 139°07' | - | 4 | - | - | 2 | 5 DO |
| 30°48' | 140°46' | - | 1 | - | - | 1 | 1 DO |
| 29°41' | 143°01' | - | - | - | - | 3 | 1 DO, 1 BM |
| Totals | | 1 | 12 | - | 425 | 63 | 32 DO, 1 SN,<br>1 SM, 3 MS,<br>3 BR, 2 SS,<br>1 BC, 3 MF,<br>1 BM, 1 CA.<br>1 BS |

Table 14.--Catch record, 15-fathom floatline gear, John R. Manning, cruise 26

| Position | | Tuna | | | GS | LF | Miscellaneous |
|---|---|---|---|---|---|---|---|
| N. Lat. | W. Long. | AL | BE | Others | | | |
| 30°51' | 151°56' | - | 3 | - | - | - | 5 DO |
| 32°13' | 151°12' | - | 1 | - | - | 2 | 2 DO |
| 33°48' | 150°32' | - | - | - | - | - | 1 SM, 1 DO |
| 35°29' | 149°45' | - | - | - | 2 | 4 | 1 SM, 1 DO |
| 36°59' | 148°35' | - | - | - | - | - | 2 DO, 1 SM |
| 38°32' | 147°16' | - | - | - | 1 | 4 | - |
| 39°49' | 146°25' | - | - | - | - | 5 | 1 SM |
| 41°03' | 145°05' | - | - | - | 7 | 2 | - |
| 41°51' | 144°26' | - | - | - | 34 | - | 1 BS |
| 43°31' | 143°21' | - | - | - | 20 | 1 | - |
| 47°31' | 140°38' | - | - | - | 1 | 3 | - |
| 46°19' | 139°08' | - | - | - | 14 | - | 2 BR, 1 MS |
| 45°18' | 137°34' | - | - | - | 12 | 1 | - |
| 43°56' | 136°10' | - | - | - | - | 1 | - |
| 42°29' | 134°40' | - | - | - | 2 | 1 | - |
| 41°26' | 133°48' | - | - | - | 25 | 1 | - |
| 40°53' | 133°03' | - | - | - | 11 | - | - |
| 42°08' | 131°30' | - | - | - | 15 | 1 | - |
| 43°25' | 130°00' | - | - | - | 2 | 7 | - |
| 42°31' | 128°31' | - | - | - | 14 | - | - |
| 41°39' | 126°41' | - | - | - | 28 | - | - |
| 40°17' | 128°18' | 1 | - | - | 39 | - | - |
| 36°52' | 123°37' | - | - | - | 20 | - | 6 SS |
| 36°01' | 122°59' | - | - | - | 10 | - | - |
| 35°02' | 122°15' | - | - | - | 23 | - | - |
| 34°52' | 125°14' | - | - | - | 5 | 1 | 1 BR |
| 34°58' | 126°48' | 1 | - | - | 2 | - | 1 MS |
| 34°55' | 128°33' | 1 | - | - | 1 | - | - |
| 34°47' | 130°17' | - | - | - | - | - | - |
| 36°20' | 131°04' | - | - | - | 2 | - | - |
| 37°39' | 131°33' | 2 | 1 | - | 2 | - | - |
| 38°43' | 132°16' | - | - | - | 4 | 2 | - |
| 37°22' | 134°09' | - | - | - | 1 | 2 | 5 DO |
| 35°44' | 135°58' | - | - | - | - | 2 | 4 DO |
| 34°13' | 137°44' | - | - | - | - | 3 | 6 DO |
| 32°26' | 139°07' | - | 2 | - | - | 2 | 3 DO |
| 30°48' | 140°46' | - | - | - | - | 1 | 1 BS |
| 29°41' | 143°01' | - | 2 | - | - | 5 | 1 DO, 1 WA |
| Totals | | 5 | 9 | - | 297 | 51 | 30 DO, 4 SM, 2 BS, 3 BR, 2 MS, 6 SS, 1 WA |

Table 15.--Summary of surface trolling, Charles H. Gilbert cruise 23

| Date 1955 | Within positions | | | | Hours trolled | Number of line hours | Catch | Lost, identified | Lost, un- identified | Speed, knots |
|---|---|---|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | N. Lat. | W. Long. | | | | | | |
| 9/15 | 21°15' | 158°00' | 22°40' | 159°10' | 2.5 | 5 | - | - | - | 9.5 |
| 9/16 | 22°40' | 159°10' | 24°15' | 160°30' | 12.5 | 100 | - | - | - | 8.5 |
| 9/17 | 25°40' | 161°30' | 27°05' | 162°30' | 12.5 | 100 | 2 DO | - | - | 8.5 |
| 9/18 | 28°35' | 163°02' | 29°38' | 164°32' | 11.5 | 92 | 1 DO | - | - | 8.5 |
| 9/19 | 31°00' | 165°05' | 32°32' | 165°02' | 10 | 80 | - | - | - | 6.5 |
| 9/20 | 34°00' | 165°00' | 35°29' | 164°50' | 12 | 96 | - | - | - | 6.5 |
| 9/21 | 36°48' | 164°45' | 38°14' | 164°46' | 12.5 | 100 | 2 DO | - | - | 6.5 |
| 9/22 | 39°38' | 164°57' | 41°00' | 164°57' | 13 | 104 | - | - | - | 6.5 |
| 9/23 | 40°51' | 164°57' | 42°21' | 164°46' | 13 | 104 | - | - | - | 6.5 |
| 9/24 | 42°22' | 164°41' | 43°18' | 164°40' | 10.5 | 84 | 2 AL | 3 AL | - | 6.5 |
| 9/25 | 43°20' | 164°35' | 44°28' | 164°53' | 9.5 | 76 | - | - | 4 | 6.5 |
| 9/26 | 44°40' | 164°55' | 45°40' | 165°05' | 9.5 | 76 | 1 AL | - | 3 | 6.5 |
| 9/27 | 45°48' | 165°00' | 46°50' | 165°01' | 10.5 | 84 | - | - | - | 6.5 |
| 9/28 | 47°05' | 165°06' | 47°39' | 166°17' | 12.5 | 59 | - | - | - | 6-7 |
| 9/29 | 47°21' | 166°38' | 47°30' | 164°52' | 9 | 70 | - | - | - | 6.5 |
| 9/30 | 47°14' | 164°15' | 46°50' | 164°20' | 2.5 | 20 | - | - | - | 6.5 |
| 9/30 | 47°14' | 164°15' | 46°50' | 164°20' | 2.5 | 15 | - | - | - | 8 |
| 10/1 | 45°15' | 164°39' | 44°44' | 164°37' | 2 | 16 | - | - | - | 6.5 |
| 10/1 | 45°15' | 164°39' | 44°44' | 164°37' | 3.5 | 28 | - | - | - | 8 |
| 10/2 | 43°09' | 164°22' | 42°36' | 164°24' | 5.5 | 44 | - | - | - | 6-7 |
| 10/3 | 41°09' | 164°31' | 40°47' | 164°32' | 5 | 40 | - | - | 1 | 6.5-7 |
| 10/4 | 39°04' | 164°31' | 39°22' | 164°19' | 5 | 40 | 2 DO | - | - | 6.5-7 |
| 10/5 | 41°18' | 162°07' | 41°18' | 162°07' | 12 | 96 | - | - | - | 6.5 |
| 10/6 | 41°47' | 160°09' | 42°18' | 158°23' | 12 | 72 | - | - | - | 6.5 |
| 10/8 | 43°28' | 152°37' | 43°44' | 150°44' | 11.5 | 41 | - | 1 AL | - | 6.5 |
| 10/9 | 43°34' | 148°17' | 42°12' | 147°12' | 12 | 84 | 14 AL, 2 SJ | 2 AL | 5 | 6.5 |
| 10/10 | 41°11' | 146°14' | 40°32' | 144°32' | 12 | 44 | 2 AL, 1 SJ | 1 AL | - | 6.5-7.5 |
| 10/11 | 40°02' | 143°02' | 39°22' | 143°46' | 12 | 87.5 | 1 AL, 1 SJ | - | 4 | 7 |
| 10/12 | 38°05' | 144°14' | 39°27' | 144°12' | 11.5 | 92 | - | - | - | 6.5-7 |
| 10/13 | 39°41' | 144°00' | 40°20' | 144°15' | 12 | 51 | - | - | - | 4-6 |
| 10/14 | 40°15' | 144°32' | 41°25' | 144°41' | 10 | 80 | 6 AL | - | 3 | 6.5 |
| 10/15 | 41°23' | 144°38' | 42°41' | 144°43' | 10 | 80 | 7 AL | 1 AL | - | 6.5 |
| 10/16 | 42°40' | 144°31' | 43°50' | 144°52' | 10 | 80 | 6 AL | 2 AL | - | 6.5 |
| 10/17 | 43°52' | 144°48' | 44°56' | 144°49' | 11.5 | 82.5 | 22 AL | 2 AL | 3 | 6.5 |
| 10/18 | 44°48' | 144°52' | 46°14' | 144°57' | 10.5 | 84 | 3 AL | - | 2 | 6.5 |
| 10/19 | 46°36' | 144°47' | 47°55' | 144°37' | 11 | 88 | - | - | - | 6.5 |
| 10/20 | 47°40' | 144°30' | 47°30' | 144°28' | 11.5 | 61 | - | - | - | 6.5 |
| 10/21 | 46°07' | 144°58' | 46°07' | 144°58' | 2.5 | 15 | - | - | - | 3-6.5 |
| 10/22 | 45°32' | 144°38' | 44°39' | 144°44' | 10.5 | 84 | - | - | - | 6.5 |
| 10/23 | 43°52' | 143°58' | 42°43' | 143°54' | 11 | 88 | - | - | 1 | 6.5 |
| 10/24 | 41°07' | 143°56' | 41°07' | 143°56' | 1 | 8 | - | - | - | 5-6.5 |
| 10/25 | 39°48' | 144°23' | 38°42' | 144°12' | 10 | 80 | - | - | - | 6.5 |
| 10/26 | 37°21' | 144°42' | 37°16' | 144°50' | 4 | 32 | - | - | - | 6.5 |
| 10/27 | 35°45' | 145°22' | 35°17' | 145°34' | 4 | 32 | - | - | - | 6.5 |
| 10/28 | 34°05' | 145°50' | 32°50' | 146°06' | 12 | 96 | 1 DO, 1 SJ | - | - | 6.5-7 |
| 10/29 | 31°06' | 146°40' | 29°53' | 147°10' | 12 | 84 | - | - | - | 6.5 |
| 10/30 | 28°45' | 149°00' | 27°20' | 150°35' | 12 | 84 | 1 SJ | 1 SJ | 1 | 9 |
| 10/31 | 26°10' | 152°05' | 25°00' | 153°20' | 12 | 96 | - | - | - | 9 |
| 11/1 | 23°50' | 154°45' | 22°30' | 156°10' | 12.5 | 75 | - | - | - | 9 |
| 11/2 | 21°20' | 157°40' | 21°15' | 158°00' | 3 | 18 | - | - | - | 9 |
| Totals | | | | | 463 | 3,348 | 8 DO<br>64 AL<br>6 SJ | 12 AL<br>1 SJ | 27 | |

Table 16.--Catch record, 5-fathom floatline gear, Charles H. Gilbert cruise 23

| Position | | Tuna | | | GS | LF | Miscellaneous |
|---|---|---|---|---|---|---|---|
| N. Lat. | W. Long. | AL | BE | Others | | | |
| 47°14' | 164°15' | - | - | - | 1 | 2 | - |
| 45°08' | 164°40' | - | - | - | 6 | 1 | - |
| 43°12' | 164°30' | - | - | - | 5 | 1 | - |
| 41°04' | 164°29' | 1 | - | - | 3 | - | 1 DO |
| 39°04' | 164°40' | - | - | - | 5 | 1 | 3 DO |
| 46°07' | 144°58' | - | - | - | 12 | - | - |
| 37°36' | 144°40' | - | 1 | - | 1 | - | - |
| 35°49' | 145°20' | - | 2 | 1 SJ | - | - | - |
| Totals | | 1 | 3 | 1 SJ | 33 | 5 | 4 DO |

Table 17.--Catch record, 15-fathom floatline gear, Charles H. Gilbert cruise 23

| Position | | Tuna | | | GS | LF | Miscellaneous |
|---|---|---|---|---|---|---|---|
| N. Lat. | W. Long. | AL | BE | Others | | | |
| 47°14' | 164°15' | - | - | - | - | 4 | - |
| 45°08' | 164°40' | - | - | - | 4 | 2 | 1 BS |
| 43°12' | 164°30' | - | - | - | 5 | 1 | - |
| 41°04' | 164°29' | - | - | - | 4 | 1 | 1 DO |
| 39°04' | 164°40' | - | - | - | 3 | 2 | 3 DO |
| 46°07' | 144°58' | - | - | - | 4 | 1 | - |
| 37°36' | 144°40' | - | - | - | 2 | 1 | - |
| 35°49' | 145°20' | - | 2 | - | - | 1 | - |
| Totals | | - | 2 | - | 22 | 13 | 1 BS<br>4 DO |

Table 18.--Gill-net catch record, Charles H. Gilbert cruise 23

| Position | | Date set | AL | GS | Others |
|---|---|---|---|---|---|
| N. Lat. | W. Long. | 1955 | | | |
| 43°22' | 164°40' | 9/24 | 8 | 2 | - |
| 44°38 | 164°55' | 9/25 | 1 | 9 | - |
| 45°41' | 165°05' | 9/26 | 1 | 9 | Squid (fragments) |
| 47°30' | 164°52' | 9/29 | - | 3 | 1 BR, 1 fur seal |
| 41°25' | 144°42' | 10/14 | 1 | - | 1 BR |
| Totals | | | 11 | 23 | 2 BR<br>1 fur seal<br>Squid (fragments) |

Table 19.--Number of fish tagged[1/] during the 1955 albacore cruises

| Cruises | Number tagged | |
|---|---|---|
| | AL | Others |
| Manning 25 | - | 2 BE |
| Manning 26 | 63 | 9 BE |
| Smith 29 | 1 | 17 BE<br>1 YF |
| Smith 30 | - | - |
| Gilbert 23 | 52 | - |
| Total | 116 | 29 BE<br>1 YF |

[1/] The "type G" tag (Wilson 1953) and tagging methods employed were similar to those used by POFI on previous albacore cruises (Shomura and Otsu 1956).

Table 20.--Secchi disc measurements, Hugh M. Smith cruise 29

| Position | | Date | Meters[1/] |
|---|---|---|---|
| N. Lat. | W. Long. | 1955 | |
| 28°25' | 155°04' | 5/5 | 47.5 |
| 30°03' | 155°10' | 5/6 | 32.9 |
| 31°59' | 154°46' | 5/7 | 23.8 |
| 33°59' | 154°48' | 5/8 | 21.9 |
| 35°51' | 154°52' | 5/9 | 25.6 |
| 37°41' | 154°49' | 5/10 | 21.9 |
| 38°17' | 154°43' | 5/11 | 11.0[2/] |
| 40°02' | 155°03' | 5/12 | 12.8[2/] |
| 42°26' | 154°54' | 5/13 | 20.1 |
| 32°08' | 147°20' | 5/17 | 20.1 |
| 33°44' | 164°47' | 5/18 | 23.8 |
| 35°42' | 147°29' | 5/19 | 21.9 |
| 37°48' | 146°49' | 5/20 | 21.9 |
| 29°51' | 146°42' | 5/21 | 14.6[2/] |
| 41°50' | 147°00' | 5/22 | 14.6[2/] |
| 41°39' | 139°02' | 5/30 | 9.1[2/] |
| 39°29' | 139°00' | 5/31 | 16.5[2/] |
| 37°18' | 139°00' | 6/1 | 21.9 |
| 35°13' | 138°47' | 6/2 | 27.4 |
| 33°02' | 139°07 | 6/3 | 20.1 |
| 30°57' | 139°04' | 6/4 | 25.6 |
| 28°56' | 139°07' | 6/5 | 21.9 |
| 27°55' | 141°28' | 6/6 | 27.4 |
| 26°43' | 143°42' | 6/7 | 29.3 |
| 25°52' | 145°50' | 6/8 | 29.3 |
| 25°14' | 148°10' | 6/9 | 25.6 |
| 24°17' | 150°16' | 6/10 | 25.6 |
| 23°30' | 152°39' | 6/11 | 20.1 |
| 22°38' | 154°46' | 6/12 | 20.1 |
| 22°02' | 156°13' | 6/13 | 20.1 |

[1/] Original measurements made in fathoms
[2/] Relatively low transparency

Table 21.--Secchi disc measurements, John R. Manning cruise 25

| Position | | Date | Meters |
|---|---|---|---|
| N. Lat. | W. Long. | 1955 | |
| 28°14' | 175°05' | 5/12 | 38 |
| 29°40' | 175°12' | 5/13 | 24 |
| 31°24' | 175°07' | 5/14 | 23 |
| 33°01' | 175°00' | 5/15 | 23 |
| 34°29' | 175°03' | 5/16 | 27 |
| 36°06' | 174°58' | 5/17 | 12[1/] |
| 37°54' | 174°46' | 5/18 | 20 |
| 39°32' | 174°37' | 5/19 | 24 |
| 31°36' | 165°16' | 5/24 | 30 |
| 33°40' | 165°32' | 5/25 | 27 |
| 35°28' | 164°54' | 5/26 | 19[1/] |
| 36°54' | 165°13' | 5/27 | 18[1/] |
| 39°01' | 165°10' | 5/28 | 15[1/] |
| 40°54' | 164°54' | 5/29 | 21 |
| 29°04' | 160°01' | 6/3 | 37 |
| 27°05' | 159°30' | 6/4 | 33 |
| 25°23' | 159°00' | 6/5 | 34 |
| 23°28' | 158°33' | 6/6 | 33 |

[1/] Relatively low transparency

Table 22.--Secchi disc measurements, John R. Manning cruise 26[1/]

| Position | | Date | Meters[2/] |
|---|---|---|---|
| N. Lat. | W. Long. | 1955 | |
| 30°51' | 151°56' | 7/19 | 36.6 |
| 32°13' | 151°12' | 7/20 | 29.3 |
| 33°48' | 150°32' | 7/21 | 22.8 |
| 35°29' | 149°45' | 7/22 | 27.4 |
| 36°59' | 148°35' | 7/23 | 32.0 |
| 38°32' | 147°16' | 7/24 | 25.6 |
| 39°49' | 146°25' | 7/25 | 26.5 |
| 41°03' | 145°05' | 7/26 | 15.5[3/] |
| 41°51' | 144°26' | 7/27 | 15.5[3/] |
| 43°31' | 143°21' | 7/28 | 20.1 |
| 47°31' | 140°38' | 7/31 | 12.8[3/] |
| 46°19' | 139°08 | 8/1 | 13.7[3/] |
| 45°18' | 137°34' | 8/2 | 18.3 |
| 43°56' | 136°10' | 8/3 | 14.6[3/] |
| 42°29' | 134°40' | 8/4 | 19.2 |
| 41°26 | 133°48' | 8/5 | 21.9 |
| 40°53' | 133°03' | 8/6 | 21.9 |
| 42°08' | 131°30' | 8/7 | 22.8 |
| 43°25' | 130°00' | 8/8 | 23.8 |
| 42°31' | 128°31' | 8/9 | 16.5[3/] |
| 41°39' | 126°41' | 8/10 | 13.7[3/] |
| 40°17' | 128°18' | 8/11 | 14.6[3/] |
| 36°52' | 123°37' | 8/21 | 14.6[3/] |
| 36°01' | 122°59' | 8/22 | 13.7[3/] |
| 35°02' | 122°15' | 8/23 | 11.0[3/] |
| 34°52' | 125°14' | 8/25 | 12.8[3/] |
| 34°55' | 128°33' | 8/27 | 20.1 |
| 34°47' | 130°17' | 8/28 | 27.4 |
| 36°20' | 131°04' | 8/29 | 32.9 |
| 37°39' | 131°33' | 8/30 | 21.9 |
| 38°43' | 132°16' | 8/31 | 27.4 |
| 37°22' | 134°09' | 9/1 | 32.9 |
| 35°44' | 135°58' | 9/2 | 29.3 |
| 34°13' | 137°44' | 9/3 | 31.1 |
| 32°26' | 139°07' | 9/4 | 32.9 |
| 30°48' | 140°46' | 9/5 | 31.1 |
| 29°41' | 143°01' | 9/6 | 23.8 |

[1/] Secchi disc readings taken during cruise 30 of the Smith have been published previously (McGary et al. 1956).

[2/] Original measurements were made in fathoms.

[3/] Relatively low transparency

Table 23.--Secchi disc measurements, Charles H. Gilbert cruise 23

| Position | | Date | Meters |
|---|---|---|---|
| N. Lat. | W. Long. | 1955 | |
| 43°54' | 164°38' | 9/25 | 22 |
| 44°58' | 164°57' | 9/26 | 10 1/ |
| 45°52' | 165°00' | 9/27 | 9 1/ |
| 47°23' | 166°14' | 9/29 | 10 1/ |
| 47°14' | 164°15' | 9/30 | 10 1/ |
| 45°08' | 164°40' | 10/1 | 12 1/ |
| 43°12' | 164°30' | 10/2 | 15 1/ |
| 41°04' | 164°29' | 10/3 | 15 1/ |
| 39°04' | 164°40' | 10/4 | 27 |
| 38°37' | 144°19' | 10/12 | 27 |
| 40°46' | 144°36' | 10/14 | 26 |
| 43°14' | 144°36' | 10/16 | 14 1/ |
| 45°29' | 144°54' | 10/18 | 14 1/ |
| 37°36' | 144°40' | 10/26 | 21 |

1/ Relatively low transparency

Table 24.--Salinity and relevant data, John R. Manning cruise 25

| BT No. | Position | | GCT date 1955 | GCT time | Surface salinity ‰ | Surface temp. °F. | Air temp. °F. |
|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | | | | | |
| 24 | 28°14' | 175°05' | 5/12 | 2335 | 35.71 | 76.0 | 75.0 |
| 26 | 28°59' | 176°00' | 5/13 | 0930 | 35.51 | 73.2 | 72.0 |
| 28 | 29°40' | 175°12' | 5/13 | 2329 | 35.19 | 70.5 | 70.1 |
| 30 | 30°24' | 175°12' | 5/14 | 0930 | 34.86 | 67.7 | 68.3 |
| 32 | 31°24' | 175°08' | 5/14 | 2355 | 35.03 | 68.6 | 68.8 |
| 34 | 32°04' | 175°04' | 5/15 | 0940 | 34.81 | 65.5 | 65.2 |
| 36 | 33°01' | 175°00' | 5/15 | 2330 | 34.76 | 65.5 | 67.9 |
| 38 | 33°41' | 175°00' | 5/16 | 0937 | 34.63 | 63.6 | 63.9 |
| 40 | 34°29' | 175°04' | 5/16 | 2340 | 34.65 | 62.0 | 58.0 |
| 42 | 35°17' | 175°03' | 5/17 | 0930 | 34.63 | 60.1 | 55.0 |
| 44 | 36°06' | 174°58' | 5/17 | 2335 | 34.62 | 59.3 | 58.0 |
| 46 | 36°53' | 174°56' | 5/18 | 0932 | 34.55 | 58.2 | 56.5 |
| 48 | 37°54' | 174°46' | 5/18 | 2340 | 34.58 | 56.0 | 57.5 |
| 50 | 38°42' | 174°52' | 5/19 | 0940 | 34.43 | 55.0 | 57.2 |
| 52 | 39°32' | 174°37' | 5/19 | 2325 | 34.53 | 55.4 | 58.5 |
| 54 | 39°08' | 174°22' | 5/20 | 0700 | 34.43 | 55.5 | 58.3 |
| 56 | 38°06' | 173°17' | 5/20 | 1600 | 34.36 | 56.0 | 54.8 |
| 58 | 37°12' | 172°21' | 5/21 | 0200 | 34.59 | 60.5 | 59.8 |
| 60 | 36°16' | 171°28' | 5/21 | 2100 | 34.53 | 59.6 | 62.0 |
| 62 | 35°09' | 170°34 | 5/22 | 0700 | 34.87 | 62.4 | 65.0 |
| 64 | 34°06' | 169°34' | 5/22 | 1600 | 34.61 | 63.6 | 64.7 |
| 66 | 33°14' | 168°43' | 5/23 | 0200 | 34.61 | 66.0 | 65.7 |
| 68 | 32°17' | 167°50' | 5/23 | 1130 | 34.67 | 69.4 | 70.2 |
| 70 | 31°31' | 166°52 | 5/23 | 2100 | 34.97 | 69.5 | 71.5 |
| 72 | 31°31' | 165°38' | 5/24 | 0700 | 34.99 | 70.7 | 72.0 |
| 74 | 31°36' | 165°16' | 5/24 | 2225 | 35.03 | 71.0 | 74.3 |
| 76 | 32°34' | 165°18' | 5/25 | 0830 | 34.90 | 69.0 | 70.9 |
| 78 | 33°40' | 165°32' | 5/25 | 2220 | 34.99 | 68.5 | 71.4 |
| 80 | 34°19' | 165°20' | 5/26 | 0830 | 34.55 | 66.8 | 68.4 |
| 82 | 35°28' | 164°54' | 5/26 | 2225 | 34.55 | 64.2 | 67.2 |
| 84 | 36°09' | 165°05' | 5/27 | 0830 | 34.50 | 61.0 | 59.0 |
| 86 | 36°54' | 165°13' | 5/27 | 2215 | 34.71 | 57.0 | 53.3 |
| 88 | 37°55' | 165°04' | 5/28 | 0835 | 34.57 | 57.3 | 54.0 |
| 90 | 39°01' | 165°10' | 5/28 | 2213 | 34.38 | 56.4 | 55.0 |
| 92 | 39°51' | 165°10' | 5/29 | 0828 | 34.24 | 54.3 | 59.5 |
| 94 | 46°54' | 164°54' | 5/29 | 2215 | 34.10 | 51.8 | 60.5 |
| 96 | 40°43' | 164°34' | 5/30 | 0700 | 34.07 | 54.0 | 57.0 |
| 97 | 39°41' | 164°10' | 5/30 | 1135 | 33.81 | 56.6 | 60.0 |
| 99 | 38°43' | 163°27' | 5/30 | 2100 | 34.10 | 57.5 | 61.3 |
| 101 | 37°49' | 162°48' | 5/31 | 0700 | 34.15 | 58.1 | 61.5 |
| 103 | 36°47' | 162°04' | 5/31 | 1600 | 34.23 | 60.8 | 62.5 |
| 105 | 35°55' | 161°22' | 6/1 | 0200 | 34.30 | 62.0 | 66.7 |
| 107 | 34°18' | 160°43' | 6/1 | 1130 | 34.38 | 65.4 | 67.3 |
| 109 | 33°43' | 160°06' | 6/1 | 2100 | 34.79 | 68.0 | 70.0 |
| 111 | 32°44' | 159°33' | 6/2 | 0700 | 35.36 | 70.0 | 70.5 |
| 113 | 31°30' | 159°42' | 6/2 | 1600 | 34.91 | 70.1 | 70.5 |
| 115 | 30°29' | 159°56' | 6/3 | 0200 | 35.15 | 73.0 | 71.5 |
| 118 | 29°04' | 160°01' | 6/3 | 2215 | 35.51 | 73.6 | 73.9 |
| 120 | 28°03' | 159°51' | 6/4 | 0830 | 35.49 | 73.2 | 72.0 |
| 122 | 27°05' | 159°30' | 6/4 | 2205 | 35.70 | 74.4 | 75.2 |
| 124 | 27°09' | 159°18' | 6/5 | 0830 | 35.71 | 74.1 | 72.8 |
| 126 | 25°23' | 159°00' | 6/5 | 2215 | 35.47 | 74.5 | 75.6 |
| 128 | 24°15' | 158°46' | 6/6 | 0830 | 35.13 | 73.5 | 73.0 |
| 130 | 23°28' | 158°33' | 6/6 | 2220 | 35.37 | 74.5 | 77.0 |

Table 25.--Salinity and relevant data, Hugh M. Smith cruise 29

| BT No. | Position | | GCT date 1955 | GCT time | Surface salinity ‰ | Surface temp. °F. | Air temp. °F. |
|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | | | | | |
| 5 | 26°33' | 155°26' | 5/5 | 0200 | 35.24 | 72.1 | 70.0 |
| 7 | 27°58' | 155°09' | 5/5 | 1130 | 35.35 | 70.1 | 69.5 |
| 8 | 28°25' | 154°57' | 5/5 | 1740 | 35.37 | 70.2 | 69.6 |
| 11 | 28°46' | 154°57' | 5/6 | 0700 | 35.71 | 70.0 | 70.6 |
| 12 | 29°21' | 154°55' | 5/6 | 1130 | 35.44 | 69.0 | 69.0 |
| 13 | 30°00' | 155°00' | 5/6 | 1725 | 35.17 | 67.8 | 69.0 |
| 16 | 30°37' | 154°58' | 5/7 | 0715 | 35.27 | 69.6 | 69.0 |
| 17 | 31°16' | 154°56' | 5/7 | 1130 | 35.17 | 67.2 | 69.2 |
| 18 | 31°54' | 154°49' | 5/7 | 1715 | 35.05 | 66.5 | 68.2 |
| 21 | 32°30' | 154°39' | 5/8 | 0655 | 34.67 | 65.4 | 69.0 |
| 22 | 33°13' | 154°45' | 5/8 | 1130 | 34.63 | 65.8 | 68.0 |
| 23 | 33°54' | 154°45' | 5/8 | 1710 | 34.77 | 65.0 | 67.8 |
| 26 | 34°25' | 154°50' | 5/9 | 0650 | 34.34 | 63.2 | 67.3 |
| 27 | 35°06' | 154°53' | 5/9 | 1130 | 34.27 | 62.6 | 65.0 |
| 28 | 35°52' | 154°53' | 5/9 | 1700 | 33.99 | 60.3 | 62.9 |
| 31 | 36°21' | 154°51' | 5/10 | 0650 | 34.06 | 60.5 | 59.0 |
| 32 | 36°48' | 154°46' | 5/10 | 1115 | 34.13 | 59.0 | 56.8 |
| 33 | 37°40' | 154°53' | 5/10 | 1705 | 34.12 | 58.0 | 55.0 |
| 36 | 38°20' | 154°56' | 5/11 | 0700 | 34.12 | 56.0 | 55.7 |
| 37 | 38°23' | 154°51' | 5/11 | 1125 | 33.96 | 55.7 | 55.7 |
| 41 | 38°52' | 154°40' | 5/12 | 0730 | 33.93 | 56.2 | 57.8 |
| 42 | 39°24' | 154°50' | 5/12 | 1130 | 33.93 | 56.0 | 57.2 |
| 43 | 40°08' | 155°02' | 5/12 | 1715 | 33.74 | 53.1 | 58.0 |
| 46 | 40°40' | 155°02' | 5/13 | 0700 | 33.74 | 52.0 | 54.9 |
| 47 | 41°20' | 154°57' | 5/13 | 1130 | 33.71 | 51.0 | 53.0 |
| 48 | 42°20' | 154°57' | 5/13 | 1700 | 33.57 | 50.0 | 51.9 |
| 51 | 41°42' | 154°16' | 5/14 | 0700 | 33.68 | 52.5 | 54.8 |
| 53 | 40°40' | 153°28' | 5/14 | 1600 | 33.70 | 53.3 | 54.7 |
| 56 | 39°30' | 152°36' | 5/15 | 0200 | 33.75 | 57.8 | 58.8 |
| 58 | 38°76' | 152°06' | 5/15 | 1135 | 33.86 | 57.3 | 59.3 |
| 60 | 37°12' | 151°06' | 5/15 | 2110 | 34.07 | 59.3 | 63.0 |
| 62 | 36°06' | 150°19' | 5/16 | 0700 | 34.04 | 61.6 | 64.0 |
| 64 | 34°51' | 149°25' | 5/16 | 1600 | 34.16 | 63.9 | 65.3 |
| 66 | 33°42' | 148°38' | 5/17 | 0200 | 34.33 | 65.8 | 69.0 |
| 68 | 32°38' | 147°54' | 5/17 | 1130 | 34.50 | 66.1 | 68.0 |
| 69 | 32°12' | 147°17' | 5/17 | 1700 | 34.84 | 66.3 | 69.9 |
| 72 | 32°30' | 147°17' | 5/18 | 0700 | 34.57 | 66.4 | 69.2 |
| 73 | 33°08' | 147°07' | 5/18 | 1130 | 34.56 | 65.6 | 66.2 |
| 74 | 33°41' | 141°48' | 5/18 | 1700 | 34.10 | 63.6 | 61.9 |
| 77 | 34°25' | 146°50' | 5/19 | 0655 | 34.16 | 62.7 | 62.1 |
| 78 | 35°04' | 147°09' | 5/19 | 1130 | 34.16 | 63.0 | 61.5 |
| 79 | 35°36' | 147°31' | 5/19 | 1650 | 34.10 | 61.7 | 62.0 |
| 82 | 36°29' | 147°12' | 5/20 | 0700 | 34.03 | 61.0 | 62.0 |
| 83 | 37°04' | 147°03' | 5/20 | 1130 | 33.93 | 60.2 | 62.8 |
| 84 | 37°53' | 147°00' | 5/20 | 1700 | 33.93 | 60.0 | 63.0 |
| 87 | 38°33' | 146°52' | 5/21 | 0655 | 33.86 | 59.2 | 62.0 |
| 88 | 39°10' | 146°43' | 5/21 | 1130 | 33.75 | 57.0 | 56.5 |
| 89 | 39°53' | 146°40' | 5/21 | 1655 | 33.74 | 56.9 | 60.0 |
| 92 | 40°23' | 146°39' | 5/22 | 0700 | 33.75 | 56.5 | 61.0 |
| 93 | 41°03' | 146°49' | 5/22 | 1130 | 33.50 | 54.9 | 58.0 |

Table 25.--Salinity and relevant data, Hugh M. Smith cruise 29 (cont'd)

| BT No. | Position | | GCT date 1955 | GCT time | Surface salinity ‰ | Surface temp. °F. | Air temp. °F. |
|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | | | | | |
| 94 | 41°51' | 147°00' | 5/22 | 1650 | 33.45 | 53.8 | 57.9 |
| 97 | 41°14' | 146°26' | 5/23 | 0705 | 33.49 | 54.5 | 57.0 |
| 98 | 40°50' | 146°03' | 5/23 | 1130 | 33.73 | 56.8 | 57.5 |
| 100 | 39°32' | 145°12' | 5/23 | 2100 | 33.88 | 59.8 | 62.0 |
| 102 | 38°12' | 144°59' | 5/24 | 0700 | 33.95 | 61.5 | 63.5 |
| 104 | 36°42' | 144°45' | 5/24 | 1600 | 34.04 | 62.5 | 63.5 |
| 106 | 35°44' | 144°18' | 5/24 | 2215 | 33.99 | 64.0 | 67.0 |
| 108 | 35°06' | 143°54' | 5/25 | 0200 | 34.02 | 64.5 | 65.0 |
| 110 | 33°50' | 142°54' | 5/25 | 1130 | 34.43 | 63.8 | 63.5 |
| 112 | 34°29' | 141°56' | 5/25 | 2100 | 34.43 | 64.0 | 66.0 |
| 114 | 35°58' | 141°15' | 5/26 | 0700 | 33.97 | 62.7 | 63.5 |
| 116 | 37°06' | 140°54' | 5/26 | 1600 | 33.95 | 61.0 | 61.5 |
| 118 | 38°31' | 140°12' | 5/27 | 0200 | 33.39 | 60.0 | 63.0 |
| 120 | 39°54' | 139°24' | 5/27 | 1130 | 33.42 | 58.5 | 61.0 |
| 122 | 40°55' | 139°07' | 5/27 | 2100 | 33.35 | 56.8 | 61.0 |
| 124 | 42°19' | 139°07' | 5/28 | 0700 | 33.08 | 54.3 | 58.5 |
| 126 | 43°54' | 139°02' | 5/28 | 1600 | 32.95 | 51.5 | 54.5 |
| 128 | 45°20' | 138°55' | 5/29 | 1130 | 32.90 | 49.5 | 49.0 |
| 129 | 44°09' | 138°55' | 5/29 | 2100 | 32.94 | 50.5 | 51.0 |
| 131 | 42°47' | 139°01' | 5/30 | 0700 | 33.11 | 53.5 | 53.0 |
| 132 | 42°18' | 139°01' | 5/30 | 1130 | 33.12 | 54.0 | 52.0 |
| 133 | 41°48' | 138°57' | 5/30 | 1645 | 33.30 | 54.0 | 52.6 |
| 136 | 41°06' | 139°05' | 5/31 | 0700 | 33.31 | 55.2 | 53.9 |
| 137 | 40°24' | 139°02' | 5/31 | 1130 | 33.49 | 56.5 | 54.5 |
| 138 | 39°24' | 139°02' | 5/31 | 1650 | 33.43 | 56.8 | 57.0 |
| 141 | 38°51' | 138°58' | 6/1 | 0700 | 33.48 | 57.2 | 57.0 |
| 142 | 38°10' | 138°58' | 6/1 | 1130 | 33.44 | 58.6 | 55.9 |
| 143 | 37°18' | 139°05' | 6/1 | 1615 | 33.67 | 59.8 | 56.5 |
| 146 | 36°40' | 138°56' | 6/2 | 0655 | 33.73 | 59.1 | 59.9 |
| 147 | 36°00' | 138°56' | 6/2 | 1130 | 33.69 | 60.3 | 57.5 |
| 148 | 35°11' | 138°54' | 6/2 | 1645 | 34.04 | 61.1 | 60.2 |
| 151 | 34°27' | 138°50' | 6/3 | 0700 | 34.11 | 61.0 | 60.0 |
| 158 | 33°41' | 138°54' | 6/3 | 1130 | 34.16 | 61.5 | 59.0 |
| 159 | 33°01' | 139°06' | 6/3 | 1640 | 34.20 | 61.9 | 60.1 |
| 162 | 32°20' | 139°03' | 6/4 | 0700 | 34.24 | 61.4 | 61.0 |
| 164 | 30°58' | 139°08' | 6/4 | 1640 | 34.70 | 62.9 | 60.9 |
| 167 | 30°19' | 138°57' | 6/5 | 0700 | 35.01 | 64.4 | 63.5 |
| 168 | 29°39' | 138°58' | 6/5 | 1130 | 34.99 | 64.4 | 63.8 |
| 169 | 28°55' | 139°12' | 6/5 | 1645 | 34.96 | 64.8 | 65.0 |
| 173 | 28°28' | 140°49' | 6/6 | 1130 | 35.27 | 66.7 | 64.0 |
| 174 | 28°03' | 141°25' | 6/6 | 1640 | 35.25 | 66.5 | 63.5 |
| 177 | 27°37' | 142°23' | 6/7 | 0700 | 35.20 | 68.9 | 66.5 |
| 178 | 27°21' | 143°05' | 6/7 | 1130 | 35.27 | 68.1 | 67.1 |
| 179 | 26°53' | 143°48' | 6/7 | 1640 | 35.32 | 68.9 | 68.5 |
| 182 | 26°39' | 144°16' | 6/8 | 0700 | 35.08 | 69.8 | 69.5 |
| 183 | 26°17' | 145°13' | 6/8 | 1130 | 35.38 | 68.8 | 68.5 |
| 184 | 25°54' | 145°48' | 6/8 | 1645 | 35.37 | 69.8 | 69.0 |
| 187 | 25°38' | 146°34' | 6/9 | 0700 | 35.41 | 70.0 | 70.8 |
| 188 | 25°35' | 147°20' | 6/9 | 1130 | 35.31 | 70.0 | 70.9 |
| 189 | 25°12' | 148°11' | 6/9 | 1640 | 35.06 | 71.2 | 72.0 |

Table 25.--Salinity and relevant data, Hugh M. Smith cruise 29 (cont'd)

| BT No. | Position | | GCT date 1955 | GCT time | Surface salinity ‰ | Surface temp. °F. | Air temp. °F. |
|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | | | | | |
| 192 | 24°57' | 148°49' | 6/10 | 0705 | 35.07 | 71.1 | 71.1 |
| 193 | 24°40' | 149°33' | 6/10 | 1130 | 34.83 | 72.3 | 70.5 |
| 194 | 24°20' | 150°17' | 6/10 | 1640 | 35.03 | 71.5 | 71.0 |
| 197 | 24°01' | 151°00' | 6/11 | 0700 | 34.81 | 72.7 | 71.5 |
| 198 | 23°43' | 151°47' | 6/11 | 1130 | 35.00 | 72.6 | 72.7 |
| 199 | 23°28' | 152°34' | 6/11 | 1645 | 35.14 | 72.1 | 72.0 |
| 202 | 23°10' | 153°12' | 6/12 | 0700 | 34.83 | 72.9 | 71.9 |
| 203 | 22°52' | 153°54' | 6/12 | 1130 | 34.78 | 73.0 | 72.1 |
| 204 | 22°37' | 154°47' | 6/12 | 1640 | 34.59 | 73.2 | 70.0 |
| 207 | 22°25' | 155°17' | 6/13 | 0700 | 34.89 | 74.7 | 73.2 |
| 208 | 22°13' | 155°41' | 6/13 | 1130 | 34.88 | 74.1 | 74.0 |
| 209 | 22°07' | 156°13' | 6/13 | 1635 | 34.77 | 73.5 | 73.8 |

Table 26.--Salinity and relevant data, John R. Manning cruise 26[1/]

| BT No. | Position | | GCT date 1955 | GCT time | Surface salinity ‰ | Surface temp. °F. | Air temp. °F. |
|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | | | | | |
| 2 | 23°10' | 156°39' | 7/16 | 2100 | 35.21 | 74.9 | 75.0 |
| 4 | 24°16' | 155°56' | 7/17 | 0600 | 35.78 | 74.2 | 74.8 |
| 6 | 25°12' | 155°24' | 7/18 | 1600 | 35.34 | 73.0 | 72.8 |
| 8 | 26°13' | 154°49' | 7/18 | 0130 | 35.51 | 74.6 | 74.6 |
| 10 | 27°14' | 154°11' | 7/18 | 1140 | 36.08 | 73.5 | 69.8 |
| 12 | 28°37' | 153°17' | 7/18 | 2100 | 35.78 | 74.0 | 72.8 |
| 14 | 29°38' | 152°37' | 7/19 | 0530 | 35.65 | 72.8 | 71.5 |
| 17 | 30°51' | 151°56' | 7/19 | 2230 | 35.61 | 75.2 | 72.5 |
| 19 | 31°14' | 151°31' | 7/20 | 0530 | 35.74 | 73.5 | 72.8 |
| 22 | 32°13' | 151°12' | 7/20 | 2225 | 35.30 | 73.5 | 72.8 |
| 24 | 32°38' | 150°45' | 7/21 | 0530 | 35.43 | 71.5 | 69.9 |
| 27 | 33°48' | 150°32' | 7/21 | 2230 | 35.37 | 72.5 | 71.2 |
| 29 | 34°16' | 150°10' | 7/22 | 0530 | 34.92 | 71.6 | 70.1 |
| 32 | 35°29' | 149°46' | 7/22 | 2100 | 34.72 | 71.2 | 70.0 |
| 35 | 36°34' | 148°42' | 7/23 | 1130 | 34.45 | 69.9 | 68.1 |
| 37 | 36°59' | 148°36' | 7/23 | 2125 | 34.69 | 69.8 | 70.5 |
| 40 | 38°08' | 147°30' | 7/24 | 1130 | 34.36 | 68.3 | 64.8 |
| 42 | 38°22' | 147°16' | 7/24 | 2120 | 34.32 | 69.0 | 66.0 |
| 45 | 39°38' | 146°30' | 7/25 | 1130 | 33.91 | 65.6 | 63.6 |
| 47 | 39°49' | 146°25' | 7/25 | 2105 | 34.04 | 65.8 | 67.5 |
| 50 | 40°55' | 145°23' | 7/26 | 1130 | 33.85 | 63.9 | 63.0 |
| 52 | 41°03' | 145°05' | 7/26 | 2105 | 33.62 | 63.5 | 67.0 |
| 55 | 41°54' | 144°31' | 7/27 | 1130 | 33.22 | 60.5 | 59.8 |
| 57 | 41°59' | 144°26' | 7/27 | 2120 | 33.31 | 60.3 | 60.2 |
| 60 | 43°02' | 144°00' | 7/28 | 1130 | 33.18 | 59.4 | 59.0 |
| 62 | 43°31' | 143°21' | 7/28 | 2115 | 33.10 | 59.0 | 60.5 |
| 65 | 44°33' | 142°26' | 7/29 | 1130 | 32.97 | 57.1 | 59.7 |
| 67 | 44°48' | 142°12' | 7/29 | 2115 | 33.03 | 57.4 | 57.6 |
| 69 | 46°01' | 141°25' | 7/30 | 1130 | 32.72 | 55.0 | 56.2 |
| 71 | 46°22' | 141°50' | 7/30 | 2100 | 32.81 | 55.0 | 55.0 |

[1/] Equivalent data from cruise 30 of the Hugh M. Smith have been published previously (McGary et al. 1956).

Table 26.--Salinity and relevant data, John R. Manning cruise 26[1/] (cont'd)

| BT No. | Position | | GCT date 1955 | GCT time | Surface salinity ‰ | Surface temp. °F. | Air temp. °F. |
|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | | | | | |
| 73 | 47°24' | 140°33' | 7/31 | 1130 | 32.83 | 54.6 | 54.8 |
| 75 | 47°31' | 140°38' | 7/31 | 2115 | 32.88 | 54.1 | 55.9 |
| 78 | 46°39' | 139°23' | 8/1 | 1130 | 32.76 | 55.0 | 55.5 |
| 80 | 46°19' | 139°08' | 8/1 | 2105 | 32.94 | 56.5 | 56.4 |
| 83 | 45°31' | 137°50' | 8/2 | 1130 | 32.84 | 56.5 | 57.0 |
| 85 | 45°18' | 137°34' | 8/2 | 2125 | 32.87 | 56.6 | 57.2 |
| 88 | 44°14' | 136°32' | 8/3 | 1130 | 32.91 | 58.2 | 56.5 |
| 90 | 43°56' | 136°10' | 8/3 | 2110 | 32.96 | 57.9 | 57.4 |
| 93 | 42°53' | 135°04' | 8/4 | 1130 | 33.00 | 58.0 | 57.2 |
| 95 | 42°29' | 134°40' | 8/4 | 2130 | 33.13 | 59.8 | 57.5 |
| 98 | 41°44' | 134°05' | 8/5 | 1130 | 33.27 | 60.0 | 58.5 |
| 100 | 41°26' | 133°48' | 8/5 | 2015 | 33.22 | 60.1 | 58.5 |
| 104 | 40°53' | 133°03' | 8/6 | 2020 | 33.26 | 61.0 | 59.5 |
| 108 | 42°08' | 131°30' | 8/7 | 2015 | 33.00 | 60.2 | 62.1 |
| 111 | 43°18' | 130°11' | 8/8 | 1130 | 32.94 | 58.5 | 59.2 |
| 113 | 43°25' | 130°00' | 8/8 | 2015 | 32.86 | 58.8 | 59.3 |
| 117 | 42°32' | 128°31' | 8/9 | 2015 | 32.75 | 59.8 | 61.2 |
| 121 | 41°40' | 126°41' | 8/10 | 2020 | 32.18 | 59.6 | 61.0 |
| 124 | 40°37' | 127°56' | 8/11 | 1130 | 32.74 | 59.5 | 60.0 |
| 126 | 40°17' | 128°18' | 8/11 | 2015 | 32.52 | 59.7 | 61.5 |
| 130 | 39°50' | 127°08' | 8/12 | 2045 | 32.83 | 60.0 | 60.0 |
| 133 | 38°49' | 124°57' | 8/20 | 2000 | 33.39 | 53.8 | 59.2 |
| 136 | 37°06' | 123°39' | 8/21 | 1130 | 33.64 | 55.1 | 56.5 |
| 138 | 36°52' | 123°38' | 8/21 | 2000 | 33.68 | 55.9 | 58.2 |
| 142 | 36°02' | 122°59' | 8/22 | 2030 | 33.60 | 56.7 | 58.5 |
| 146 | 35°02' | 122°15' | 8/23 | 2000 | 33.86 | 57.5 | 57.9 |
| 148 | 35°01' | 123°06' | 8/24 | 0530 | 33.78 | 55.9 | 57.9 |
| 150 | 35°04' | 123°51' | 8/24 | 1800 | 33.40 | 57.5 | 58.9 |
| 152 | 35°01' | 124°59' | 8/25 | 0530 | 33.39 | 57.5 | 58.0 |
| 154 | 34°52' | 125°14' | 8/25 | 2032 | 33.15 | 58.3 | 59.0 |
| 156 | 34°56' | 126°10' | 8/26 | 0530 | 33.62 | 60.5 | 59.9 |
| 158 | 34°58' | 126°48' | 8/26 | 2010 | 33.46 | 60.3 | 61.1 |
| 160 | 35°06' | 127°48' | 8/27 | 0530 | 33.46 | 61.7 | 62.2 |
| 162 | 34°55' | 128°33' | 8/27 | 2115 | 33.30 | 63.2 | 63.5 |
| 164 | 35°00' | 129°12' | 8/28 | 0530 | 33.49 | 64.2 | 65.2 |
| 166 | 34°48' | 130°17' | 8/28 | 2100 | 33.50 | 66.1 | 65.3 |
| 168 | 35°32' | 130°23' | 8/29 | 0530 | 33.03 | 64.0 | 63.8 |
| 171 | 36°20' | 131°04' | 8/29 | 2110 | 33.43 | 65.3 | 65.7 |
| 173 | 36°55' | 131°15' | 8/30 | 0530 | 33.46 | 65.1 | 64.9 |
| 175 | 37°39' | 131°33' | 8/30 | 2110 | 33.36 | 66.1 | 68.2 |
| 177 | 38°03' | 131°52' | 8/31 | 0535 | 33.26 | 66.2 | 67.5 |
| 179 | 38°43' | 132°16' | 8/31 | 2115 | 33.36 | 67.0 | 69.4 |
| 181 | 38°05' | 133°02' | 9/1 | 0630 | 33.37 | 66.7 | 67.8 |
| 184 | 37°22' | 134°09' | 9/1 | 2055 | 33.30 | 68.0 | 74.6 |
| 186 | 36°38' | 134°52' | 9/2 | 0530 | 33.98 | 70.2 | 70.2 |
| 189 | 35°44' | 135°58' | 9/2 | 2110 | 34.09 | 70.9 | 74.1 |
| 191 | 35°10' | 136°24' | 9/3 | 0530 | 34.23 | 70.6 | 72.3 |
| 194 | 34°14' | 137°44' | 9/3 | 2115 | 34.28 | 71.5 | 70.5 |
| 196 | 33°40' | 138°04' | 9/4 | 0530 | 34.20 | 71.0 | 69.2 |

[1/] Equivalent data from cruise 30 of the Hugh M. Smith have been published previously (McGary et al. 1956).

Table 26.--Salinity and relevant data, John R. Manning cruise 26[1/] (cont'd)

| BT No. | Position | | GCT date 1955 | GCT time | Surface salinity ‰ | Surface temp. °F. | Air temp. °F. |
|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | | | | | |
| 199 | 32°26' | 139°08' | 9/4 | 2100 | 34.72 | 70.8 | 71.2 |
| 201 | 31°54' | 139°34' | 9/5 | 0530 | 34.98 | 70.5 | 70.0 |
| 204 | 30°48' | 140°46' | 9/5 | 2115 | 34.99 | 73.2 | 73.8 |
| 206 | 30°26' | 141°31' | 9/6 | 0530 | 35.03 | 72.9 | 73.1 |
| 209 | 29°42' | 143°02' | 9/6 | 2045 | 35.27 | 74.5 | 74.9 |
| 211 | 29°12' | 143°52' | 9/7 | 0600 | 35.83 | 74.2 | 73.1 |
| 213 | 28°25' | 145°23' | 9/7 | 1600 | 35.66 | 72.8 | 72.6 |
| 215 | 27°44' | 146°52' | 9/8 | 0130 | 35.61 | 74.8 | 75.2 |
| 217 | 26°53' | 148°16' | 9/8 | 1130 | 35.74 | 73.8 | 72.5 |
| 219 | 26°04' | 149°36' | 9/8 | 2100 | 35.40 | 75.8 | 75.2 |
| 221 | 25°16' | 150°52' | 9/9 | 0600 | 35.42 | 74.9 | 73.8 |
| 223 | 24°29' | 152°19' | 9/9 | 1600 | 35.37 | 74.0 | 72.9 |
| 225 | 23°43' | 153°40' | 9/10 | 0130 | 35.21 | 78.0 | 75.7 |
| 227 | 22°52' | 155°03' | 9/10 | 1130 | 35.12 | 75.9 | 74.5 |

[1/] Equivalent data from cruise 30 of the Hugh M. Smith have been published previously (McGary et al. 1956).

Table 27.--Salinity and relevant data, Charles H. Gilbert cruise 23

| BT No. | Position | | GCT date 1955 | GCT time | Surface salinity ‰ | Surface temp. °F. | Air temp. °F. |
|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | | | | | |
| 1 | 22°45' | 159°10' | 9/16 | 0630 | 34.97 | 77.0 | 75.2 |
| 3 | 24°14' | 160°17' | 9/17 | 0530 | 34.96 | 77.5 | 78.0 |
| 5 | 25°41' | 161°25' | 9/17 | 1730 | 35.35 | 77.2 | 76.2 |
| 7 | 27°07' | 162°28' | 9/18 | 0530 | 35.29 | 77.5 | 78.1 |
| 9 | 28°35' | 163°35' | 9/18 | 1730 | 35.41 | 77.9 | 77.4 |
| 11 | 29°38' | 164°32' | 9/19 | 0530 | 35.61 | 78.0 | 77.2 |
| 13 | 31°07' | 165°05' | 9/19 | 1730 | 35.21 | 76.3 | 74.0 |
| 15 | 32°32' | 165°02' | 9/20 | 0530 | 35.05 | 75.5 | 74.9 |
| 17 | 34°09' | 165°00' | 9/20 | 1730 | 34.89 | 74.9 | 71.0 |
| 19 | 35°29' | 164°50' | 9/21 | 0530 | 34.67 | 74.2 | 74.0 |
| 21 | 36°54' | 164°41' | 9/21 | 1730 | 34.31 | 72.0 | 72.8 |
| 23 | 38°14' | 164°46' | 9/22 | 0530 | 34.09 | 71.0 | 72.0 |
| 25 | 39°44' | 164°57' | 9/22 | 1730 | 34.34 | 70.0 | 70.0 |
| 27 | 41°05' | 164°57' | 9/23 | 0530 | 33.96 | 65.9 | 60.2 |
| 29 | 42°21' | 164°46' | 9/24 | 0530 | 33.37 | 60.5 | 56.5 |
| 33 | 44°07' | 164°43' | 9/25 | 2330 | 33.26 | 60.9 | 59.0 |
| 35 | 45°12' | 164°59' | 9/26 | 2330 | 33.19 | 58.2 | 63.0 |
| 37 | 46°10' | 165°00' | 9/27 | 2330 | 32.81 | 55.2 | 50.7 |
| 39 | 47°23' | 166°14' | 9/29 | 2045 | 32.66 | 53.5 | 52.0 |
| 44 | 47°14' | 164°25' | 10/1 | 0130 | 32.75 | 53.9 | 53.9 |

Table 27.--Salinity and relevant data, Charles H. Gilbert cruise 23 (cont'd)

| BT No. | Position | | GCT date 1955 | GCT time | Surface salinity ‰ | Surface temp. °F. | Air temp. °F. |
|---|---|---|---|---|---|---|---|
| | N. Lat. | W. Long. | | | | | |
| 47 | 45°10' | 164°43' | 10/1 | 1740 | 33.22 | 57.0 | 55.0 |
| 51 | 43°55' | 164°27' | 10/2 | 1130 | 33.68 | 59.5 | 58.2 |
| 52 | 43°15' | 164°32' | 10/2 | 1745 | 33.61 | 60.4 | 58.4 |
| 55 | 42°34' | 164°24' | 10/3 | 0530 | 33.60 | 61.0 | 61.2 |
| 57 | 41°05' | 164°28' | 10/3 | 1750 | 34.03 | 65.2 | 66.2 |
| 60 | 40°32' | 164°34' | 10/4 | 0530 | 34.20 | 67.1 | 66.7 |
| 63 | 39°04' | 164°40' | 10/4 | 2210 | 34.32 | 69.0 | 69.9 |
| 65 | 39°31' | 164°14' | 10/5 | 0530 | 32.72 | 67.5 | 68.0 |
| 67 | 40°41' | 163°24' | 10/5 | 1940 | 34.31 | 66.0 | 62.8 |
| 68 | 41°49' | 160°00' | 10/6 | 1730 | 34.00 | 68.0 | 58.0 |
| 70 | 42°20' | 158°17' | 10/7 | 0530 | 33.77 | 61.2 | 58.0 |
| - | 42°20' | 158°18' | 10/7 | 2330 | 33.49 | 58.8 | 59.3 |
| - | 43°36' | 155°20' | 10/8 | 1730 | 33.58 | 57.8 | 58.8 |
| - | 43°27' | 152°22' | 10/9 | 0520 | 33.12 | 56.5 | 52.8 |
| 71 | 43°24' | 148°10' | 10/9 | 1730 | 33.66 | 58.0 | 53.1 |
| 73 | 42°04' | 147°06' | 10/10 | 0530 | 33.26 | 60.2 | 57.0 |
| - | 41°09' | 146°06' | 10/10 | 1730 | 33.60 | 66.0 | 66.0 |
| - | 40°27' | 144°15' | 10/11 | 0530 | 33.68 | 65.3 | 66.3 |
| 80 | 39°09' | 143°50' | 10/12 | 0530 | 34.11 | 68.0 | 70.0 |
| 82 | 38°21' | 144°16' | 10/12 | 1730 | 33.69 | 69.0 | 68.0 |
| 84 | 39°27' | 144°12' | 10/13 | 0530 | 33.67 | 62.1 | 65.0 |
| - | 39°43' | 144°01' | 10/13 | 1800 | 34.14 | 65.3 | 60.9 |
| - | 40°32' | 144°15' | 10/14 | 0530 | 33.91 | 63.7 | 57.8 |
| 86 | 40°29' | 144°34' | 10/14 | 1730 | 33.60 | 63.7 | 57.5 |
| 88 | 41°23' | 144°38' | 10/15 | 1730 | 33.42 | 63.0 | 64.0 |
| 90 | 42°54' | 144°33' | 10/16 | 1130 | 35.04 | 61.7 | 63.6 |
| 92 | 44°02' | 144°48' | 10/17 | 1730 | 32.90 | 57.7 | 57.3 |
| 94 | 45°04' | 144°52' | 10/18 | 1730 | 32.83 | 53.9 | 54.4 |
| 98 | 48°08' | 144°28' | 10/20 | 2330 | 32.78 | 49.5 | 48.7 |
| 101 | 46°09' | 145°00' | 10/21 | 0655 | 32.75 | 52.6 | 51.9 |
| 102 | 45°19' | 144°37' | 10/22 | 1730 | 32.77 | 53.3 | 56.0 |
| 104 | 43°40' | 143°57' | 10/23 | 1750 | 34.90 | 55.5 | 54.6 |
| 106 | 42°24' | 148°52' | 10/24 | 0530 | 35.03 | 60.6 | 62.6 |
| 107 | 41°07' | 143°57' | 10/24 | 2330 | 33.37 | 62.3 | 59.5 |
| 108 | 39°40' | 144°23' | 10/25 | 1745 | 34.20 | 66.0 | 61.0 |
| 110 | 38°28' | 144°14' | 10/26 | 0530 | 33.96 | 66.1 | 63.2 |
| 112 | 37°36' | 144°44' | 10/26 | 1725 | 34.31 | 68.0 | 66.8 |
| 115 | 37°04' | 144°53' | 10/27 | 0530 | 34.51 | 69.2 | 70.1 |
| 117 | 35°50' | 145°21' | 10/27 | 1645 | 33.26 | 70.4 | 71.2 |
| 120 | 35°17' | 145°31' | 10/28 | 0530 | 34.78 | 70.2 | 70.8 |
| 122 | 33°56' | 145°51' | 10/28 | 1730 | 35.41 | 71.2 | 72.0 |
| 124 | 37°40' | 146°09' | 10/29 | 1130 | 35.43 | 73.2 | 72.1 |
| 126 | 30°59' | 146°45' | 10/29 | 1745 | 34.31 | 74.0 | 73.7 |
| 128 | 30°15' | 147°00' | 10/30 | 0530 | 35.67 | 73.2 | 72.3 |
| 130 | 28°24' | 149°52' | 10/30 | 2330 | 35.74 | 74.1 | 73.2 |
| 132 | 27°08' | 150°52' | 10/31 | 0530 | 35.54 | 74.8 | 73.0 |
| 134 | 26°04' | 152°10' | 10/31 | 1735 | 35.25 | 75.0 | 73.5 |
| 136 | 24°52' | 153°33' | 11/1 | 0532 | 35.17 | 74.2 | 73.0 |
| 138 | 23°40' | 155°00' | 11/1 | 1730 | 35.23 | 74.9 | 74.9 |

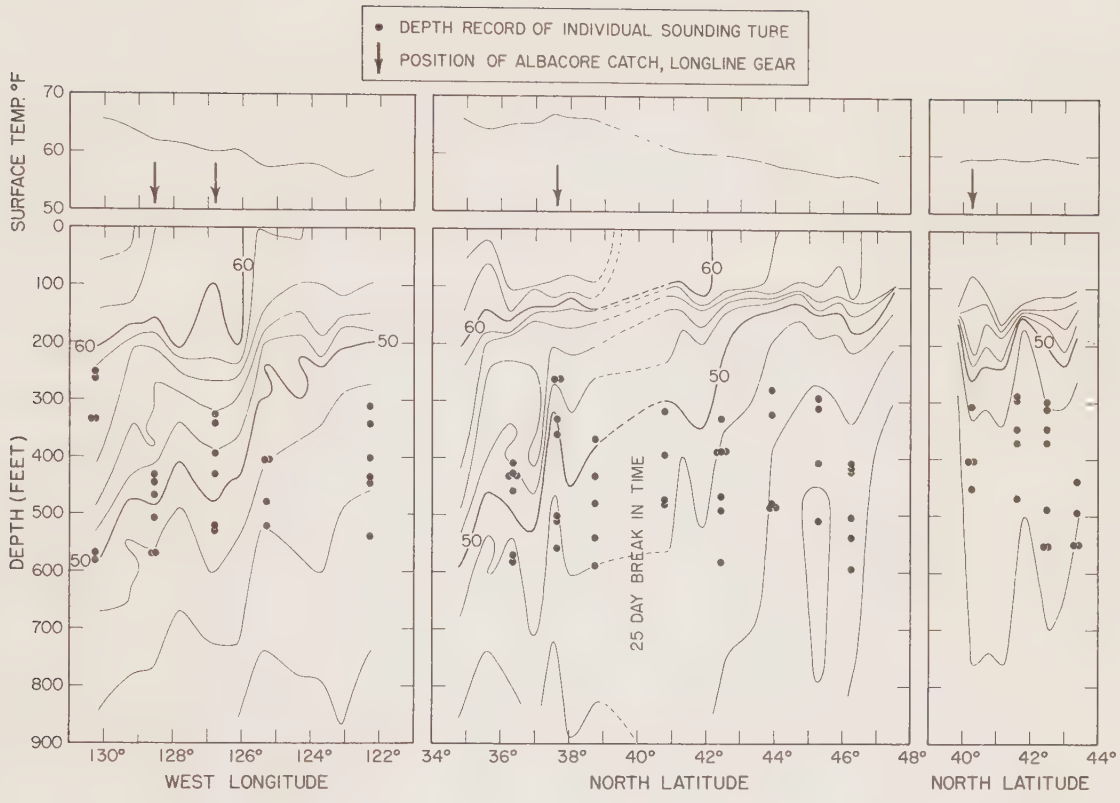


Figure 5 Figure 6 Figure 7

Figure 5.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken along 35°N. latitude; John R. Manning (cruise 26), July 15-September 10, 1955 (track shown in fig. 2).

Figure 6.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken running southeast and northwest between longitudes 130°W. and 140°W.; John R. Manning (cruise 26), July 15-September 10, 1955 (track shown in fig. 2).

Figure 7.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken running southwest between longitudes 127°W. and 129°W.; John R. Manning (cruise 26), July 15-September 10, 1955 (track shown in fig. 2).

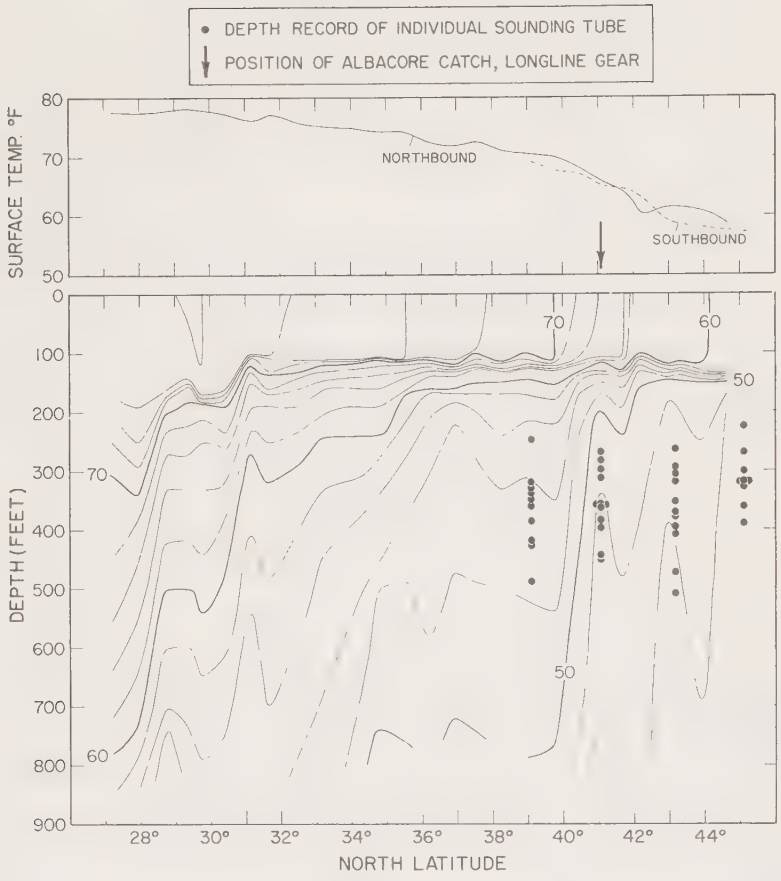


Figure 8.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken along 165°W. longitude; Charles H. Gilbert (cruise 23), September 15-November 2, 1955 (track shown in fig. 3). The temperature-depth section was taken running north of 165°W. longitude and the sounding tube depths retracing southward. All of the bathythermograph slides of the latter run and some of those covering the northernmost region of the former were lost so that only the uncorrected data from the northward track remain.

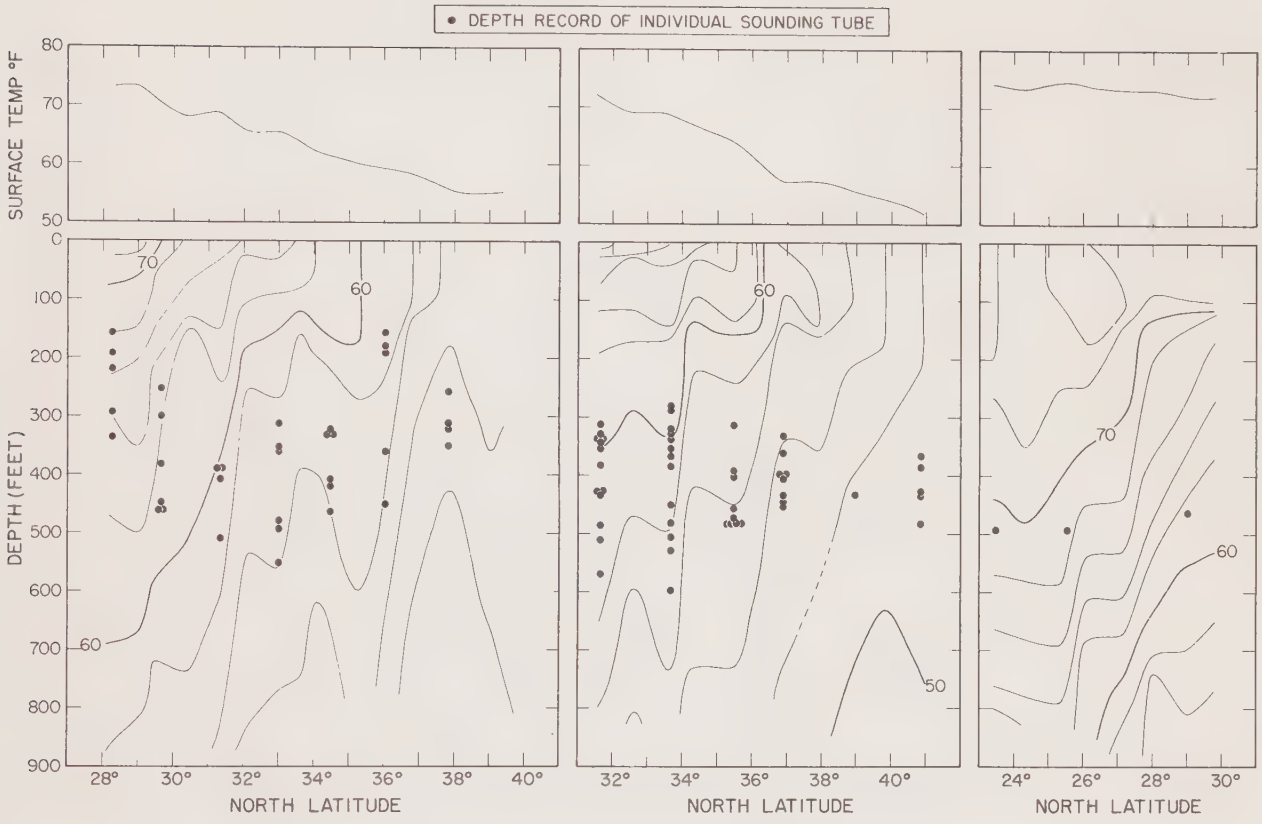


Figure 9 Figure 10 Figure 11

Figure 9.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken along 175°W. longitude; John R. Manning (cruise 25), May 2-June 7, 1955 (track shown in fig. 1).

Figure 10.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken along 165°W. longitude; John R. Manning (cruise 25), May 2-June 7, 1955 (track shown in fig. 1).

Figure 11.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken along 160°W. longitude; John R. Manning (cruise 25), May 2-June 7, 1955 (track shown in fig. 1).

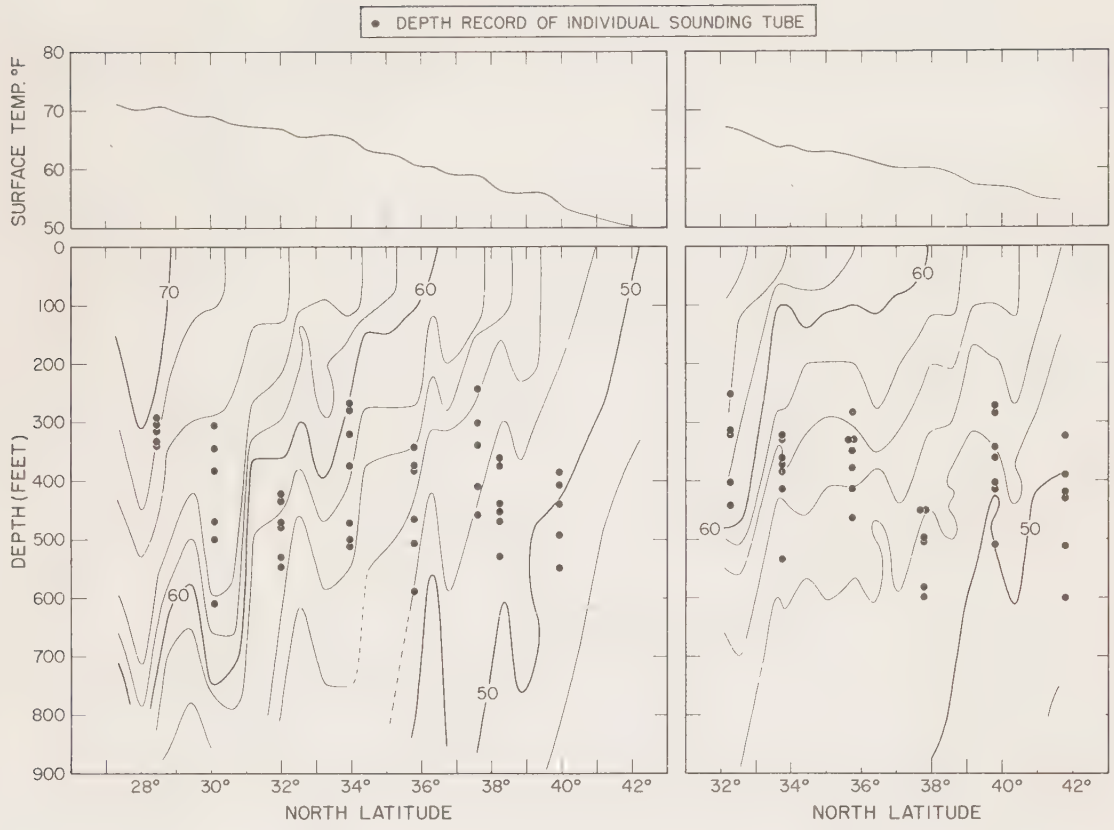


Figure 12

Figure 13

Figure 12.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken along 155°W. longitude; Hugh M. Smith (cruise 29), May 2-June 4, 1955 (track shown in fig. 1).

Figure 13.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken along 147°W. longitude; Hugh M. Smith (cruise 29), May 2-June 4, 1955 (track shown in fig. 1).

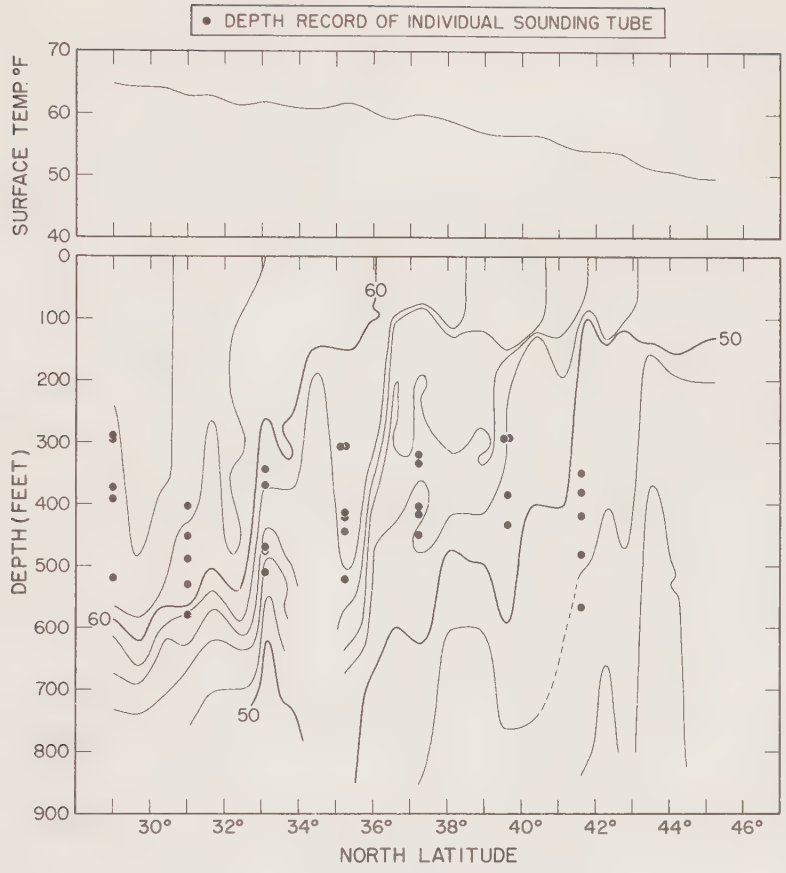


Figure 14.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken along 139°W. longitude; Hugh M. Smith (cruise 29), May 2-June 4, 1955 (track shown in fig. 1).

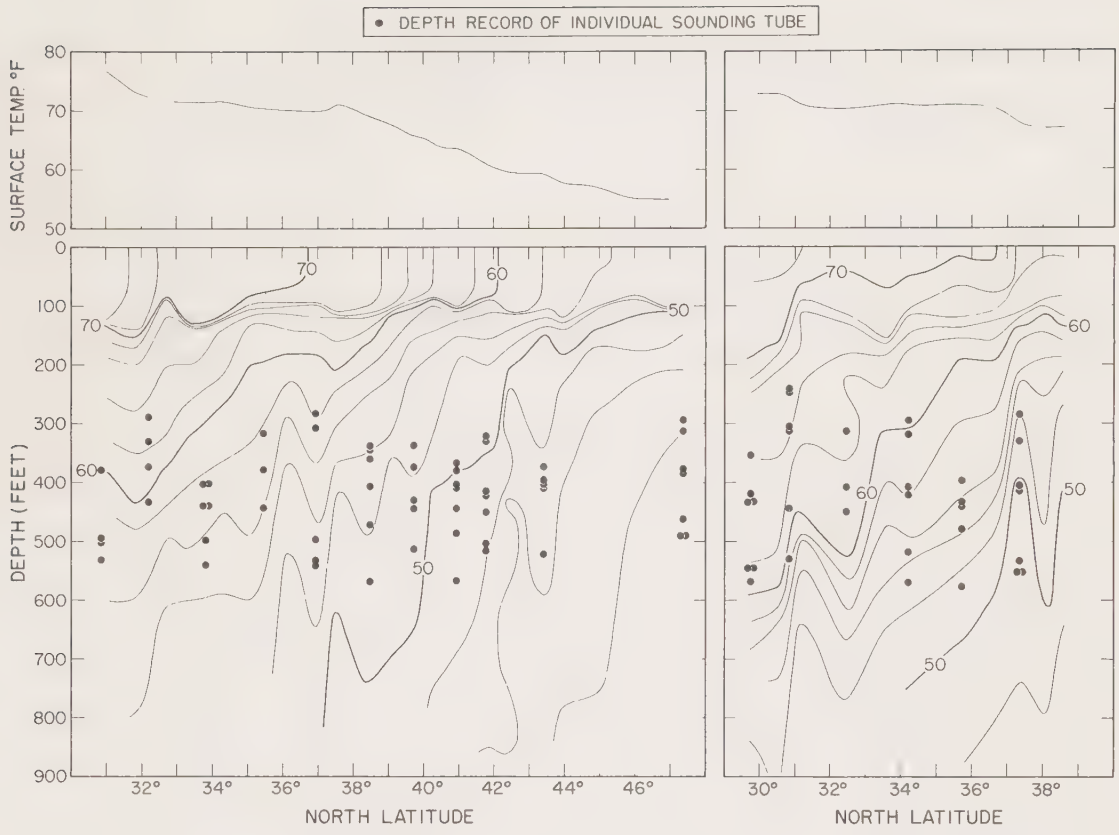


Figure 15

Figure 16

Figure 15.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken running northeast between longitudes 140°W. and 152°W.; John R. Manning (cruise 26), July 15-September 10, 1955 (track shown in fig. 2).

Figure 16.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken running southwest between longitudes 132°W. and 143°W.; John R. Manning (cruise 26), July 15-September 10, 1955 (track shown in fig. 2).

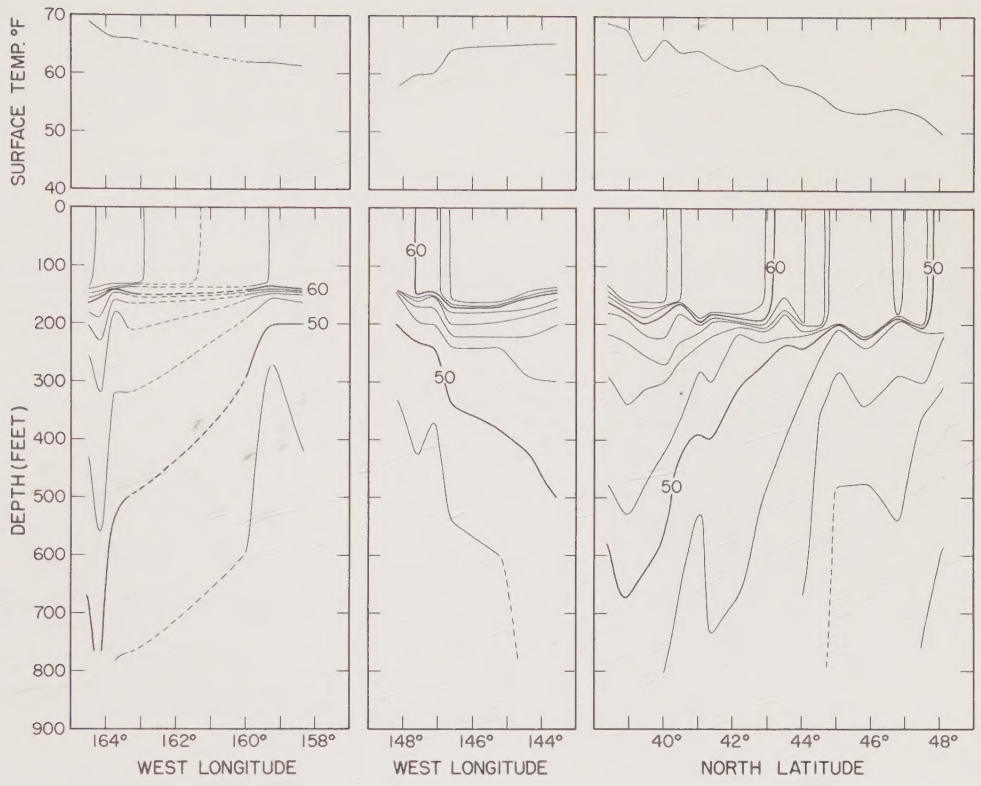


Figure 17 Figure 18 Figure 19

Figure 17.--Surface bucket temperatures (upper panel); temperature-depth section (lower panel) taken running northeast between longitudes 164°W. and 158°W.; Charles H. Gilbert (cruise 23), September 15-November 2, 1955 (track shown in fig. 3).

Figure 18.--Surface bucket temperatures (upper panel); temperature-depth section (lower panel) taken running southeast between longitudes 148°W. and 143°W.; Charles H. Gilbert (cruise 23), September 15-November 2, 1955 (track shown in fig. 3).

Figure 19.--Surface bucket temperatures (upper panel); temperature-depth section (lower panel) taken running north along 145°W. longitude; Charles H. Gilbert (cruise 23), September 15-November 2, 1955 (track shown in fig. 3).

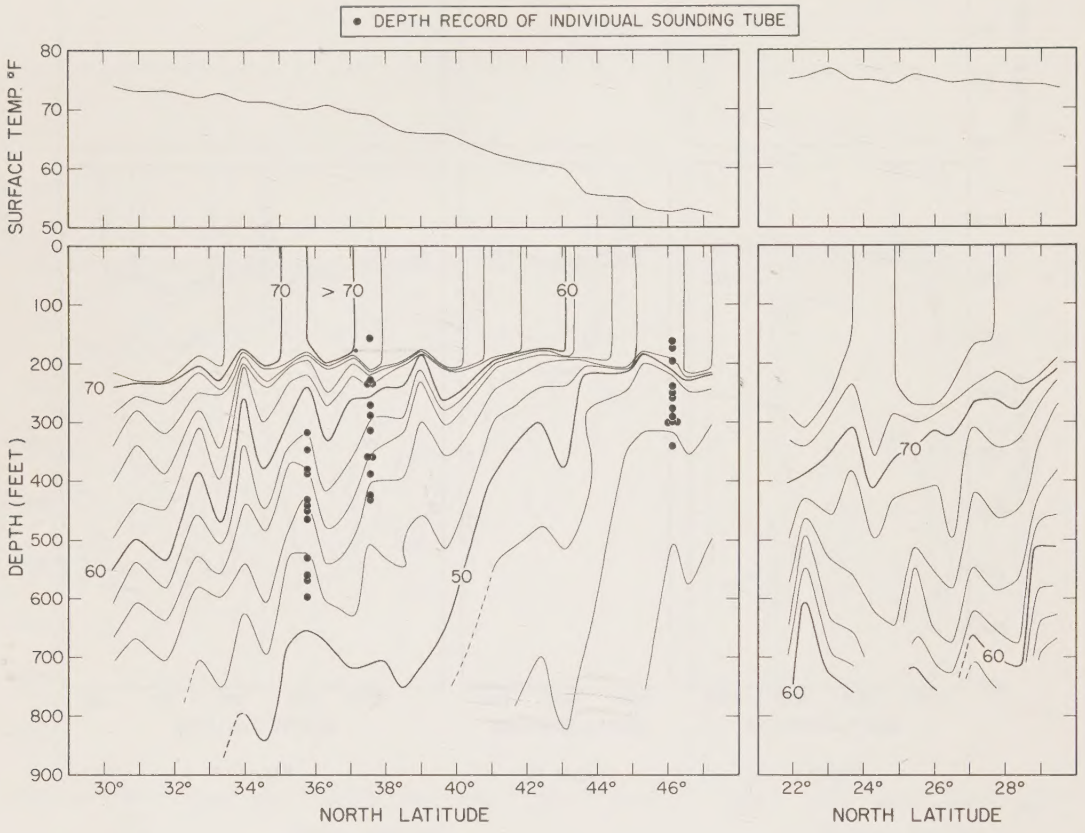


Figure 20

Figure 21

Figure 20.--Surface bucket temperatures (upper panel); temperature-depth section and sounding tube depths (lower panel) taken running south along 145°W. longitude; Charles H. Gilbert (cruise 23), September 15-November 2, 1955 (track shown in fig. 3).

Figure 21.--Surface bucket temperatures (upper panel); temperature-depth section (lower panel) taken running southwest between longitudes 147°W. and 157°W.; Charles H. Gilbert (cruise 23), September 15-November 2, 1955 (track shown in fig. 3).